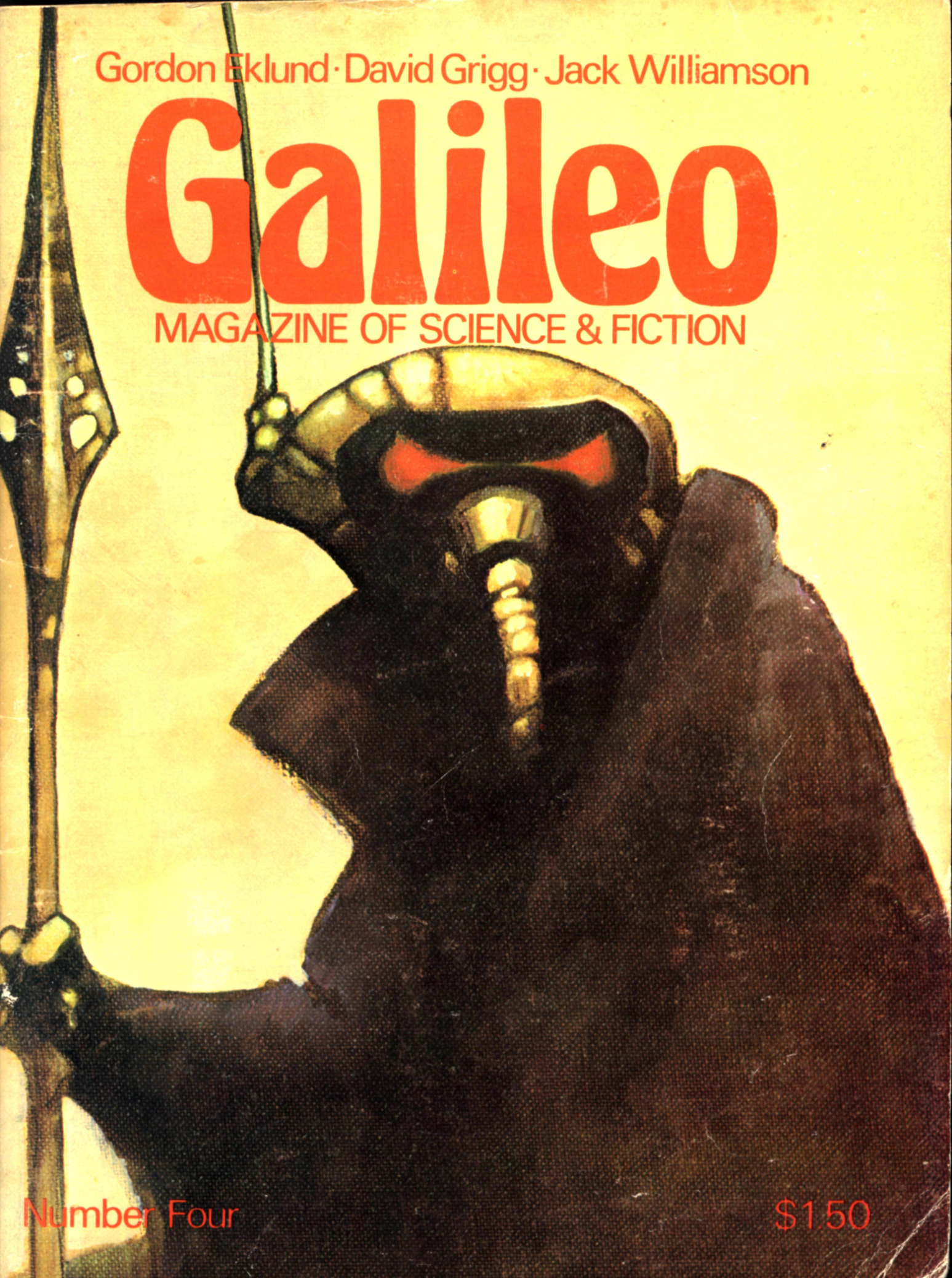


Gordon Eklund · David Grigg · Jack Williamson

Galileo

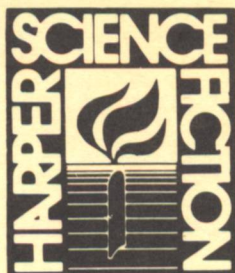
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Number Four

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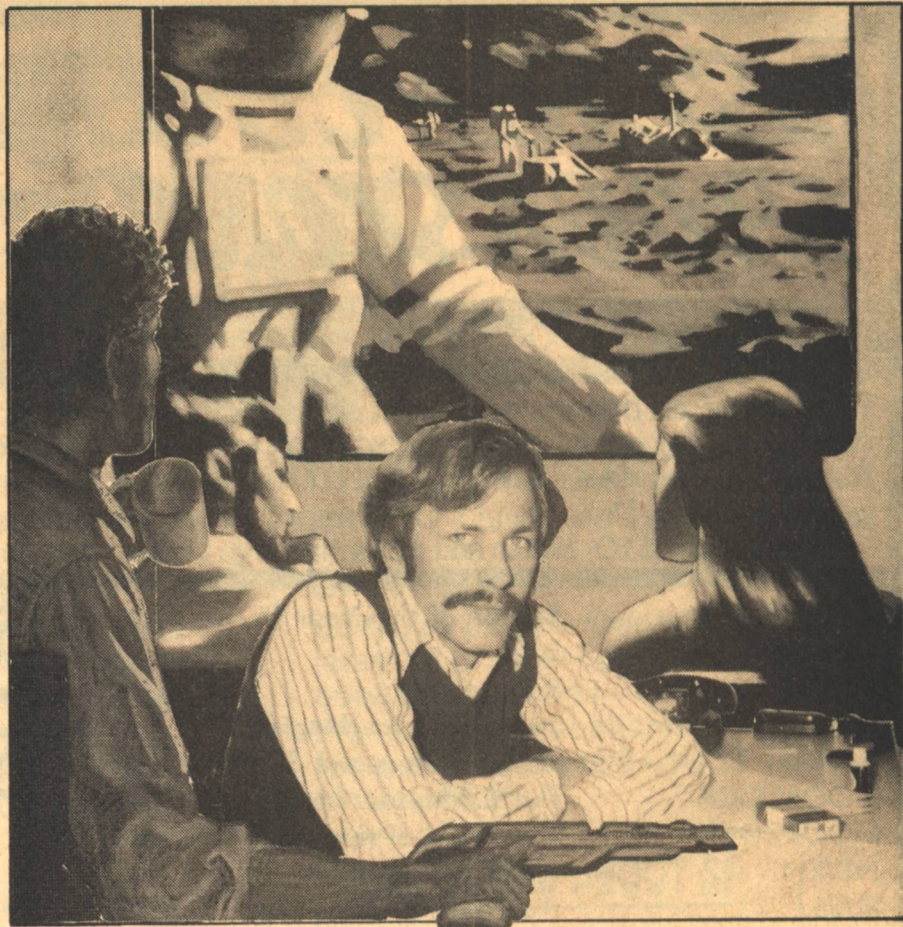
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Contents

TOP: *Lost Cosmonauts, Lancelot, Wheelie, and Theodore Kubaska.*

BOTTOM: *Bolta, Kenneth, Gordon Eklund, Valentina, James Homerson and unfortunate guard.*



Articles

THE FUTUROPHOBES

by Jack Williamson..... 8
Future shock is largely of our own creation. One positive view can build more worlds than all the pessimists put together. The evolution of society and its present attitude is the key, says Jack, inaugurating a new feature opinion column, *The Leaning Tower*.

SSOAR

by Earth/Space..... 18
"Space Now!" is the battle cry for this group of entrepreneurs. Why wait for NASA when private enterprise can do it quicker and cheaper, and make a profit! In this first of two parts the Earth/Space group present their scenario for the great leap.

THINKING OUT LOUD

by Peter Weston..... 12
The thought waves are becoming jammed with static, according to our British correspondent, calling for a halt to the use of telepathy and all that other psi-stuff in science fiction.

2 GALILEO

Stories

ONCE BY ANGELS SEEN

by Gordon Eklund..... 25
For years, Logan had kept the secret of Lancelot's exceptional behavior, and thus established a unique friendship with the great beast. Now the bureaucrats of the teeming world above threatened this refuge from both present and past, this last wilderness.

CHANNEL'S EXEMPTION

by Jacqueline Lichtenberg..... 49
The time had come when the evolution of Man had split the species in two; when the distance between a man and a woman went beyond the sexual, and the needs of the body could overcome the desires of the mind.

TO SPEAK OF MANY THINGS

by David Grigg..... 59
One of Man's most valuable talents lies in the ability to look beyond disaster or despair and find hope. Even when it is certain all is lost, that spark must be kept alive. It helps, of course, to cherish a few illusions.

SIGN OF FRIENDSHIP

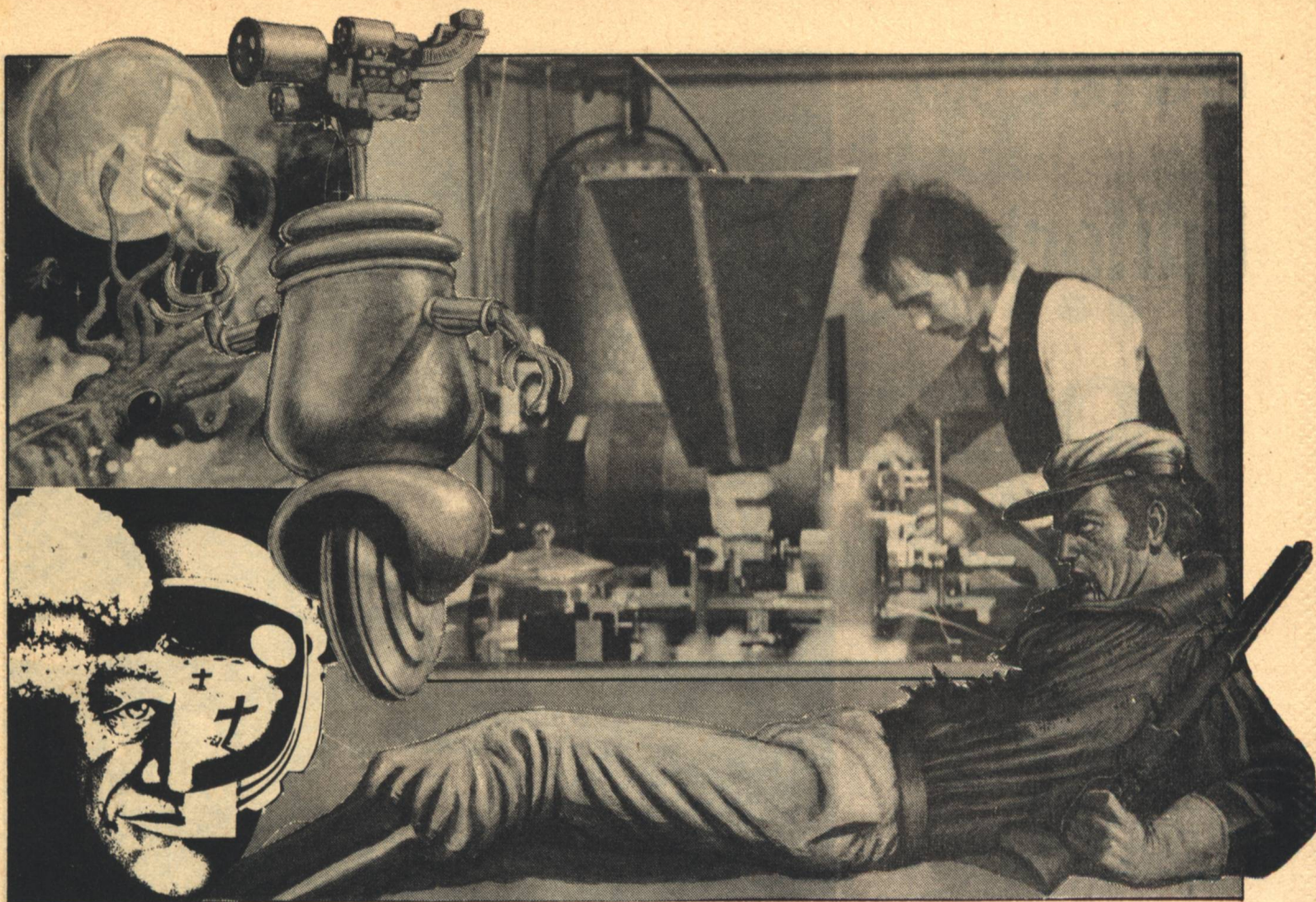
by Patrick L. McGuire..... 64
Cold war secrecy had created a catastrophic misunderstanding, leaving the Russian Cosmonauts stranded on Mars without hope of rescue. The ideological gap between East and West had outstripped the distances of spaces; how much less important the liason between a man and a woman.

UNIVAN AND THE WHEELIES

by Theodore Kubaska..... 37
Self-destruct was initiated. The station personnel had inexplicably gone to sleep. As the timer on the nuclear explosive wound down, only Univan possessed the information necessary to save the base. But what can a computer do without a human mind to guide it.

BOLTA

by Jerry Goodz..... 44
He had put aside his weapons and retired to a derelict scoutship, living with nothing more hostile than an irascible coffee dispenser. Now, with trapped comrades as bait, the High Command attempted to entice him once more to war. There was only one thing he could do...



Departments

EDITORIAL..... 4

A plea to give more of yourself, to break conventions, go out on a limb, and lift a pint or two with friends.

PROFILE..... 6

Introductions to our authors.

THE ALEPH.....70

The master of pre-cognition previews the up-and-coming titles.

REVIEWS..... 80

Universe 7 edited by Terry Carr, *New Dimensions 7* edited by Robert Silverberg, *Nebula Award Stories 11* edited by Ursula K. LeGuin, *Gateway* by Frederik Pohl, *Science Fiction at Large* edited by Peter Nicholls, *The Sign of the Moonbow* by Andrew Offutt, and *A Wreath of Stars* by Bob Shaw.

2020..... 84

The biggest event in the history of science fiction cinema, and something else.

PUBLISHER'S NOTES..... 93

Where we blame it all on sun spot activity.

TELESCOPE..... 93

Our future foretold.

INQUISITION..... 92

A few letters can make a word, and a few words can make a letter.

STAR CHAMBER..... 96

Science Fiction has Jack Williamson all to itself now, lucky us.

COVER ART

Tom Barber makes it a full year by giving us two more fine paintings.

ADVERTISERS

Harper & Row.....	FC
Science Fantasy Cassette Club.....	1
Galileo Magazine.....	5
Doubleday Books.....	11
Eon Products.....	13
Cobblestone Magazine.....	15
Real Simulations Games.....	17
Fiction Magazine.....	73
Creative Computing Magazine.....	75
Unearth Magazine.....	77
Galileo Advertising Rates.....	79
Aurora Publishers.....	77
Galaxy Magazine.....	87
Galileo Story Contest.....	89
Galileo Back Issues.....	91
The Network.....	96

Science Fantasy Bookstore..... 95

CLASSIFIED..... 94

From bazaar to bizarre.

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Editorial

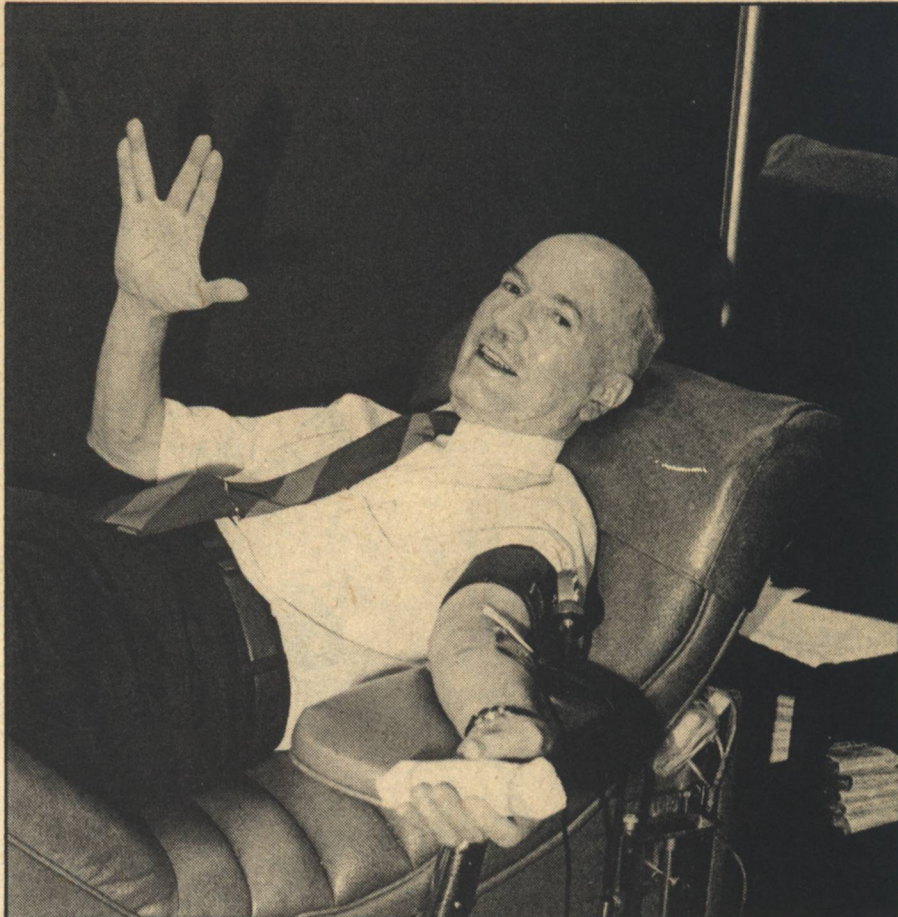
We still, each of us,
share that common
prehistoric sea . . .
It's called blood.

FOUR BILLION years ago, our one-celled ancestors swarmed happily and abundantly in Earth's prehistoric seas. Flimsy permeable membranes pulsing, they easily drew oxygen and nutrients from the warm, salty stew that was their common pot of life.

As millennia elapsed, those one-celled forebears evolved into amphibians, small land reptiles, crude mammals and finally Java, Peking, Neanderthal, Cro-Magnon and modern man. Even though it took billions of years between those primitive lifeforms and *homo sapiens*, one important thing hasn't changed at all. We still, each of us, share that common prehistoric sea. It flows through our veins, travelling miles a day, performing the same function it did for our predecessors. It's called blood.

As chemically similar as that red sea is, it was not until the early 1900's that Dr. Karl Landstein identified the genetic bloodtypes which allow us to swap bits of our inner ocean in times of need. And, it wasn't until the early 1940's that Dr. Charles Drew developed the process which makes plasma transfusions possible. (Ironically, the black doctor died from want of a blood transfusion after an all-white hospital

4 GALILEO



Janet Nelson: Irwin Memorial Blood Bank

refused to treat him.)

Robert A. Heinlein, the acknowledged Dean of Science Fiction, was luckier. Several years ago his life was saved by an unknown donor who happened to have the same rare blood type. Since then, one might say Heinlein has become a one-man bloodmobile. Each public appearance has also been an opportunity to promote the concept of giving blood.

Now he is suggesting that we of the science fiction community take up the banner. Heinlein proposes that each and every sf convention make it a point to have a bloodmobile on hand for donors. The thrust of the idea is to make sf as synonymous with blood donations as the Lions are with eye research.

We agree.

Giving blood makes sense. It's painless, takes very little time and someday may save your life. It is particularly sensible to give blood over the Labor Day weekend when blood supplies are always at their lowest. That the World Science Fiction Convention (SunCon) is held each year over the same weekend is a handy coincidence.

Science fiction readers usually examine each day's events with an eye towards the future. It doesn't take much

thought to realize the chances are exceedingly high that anyone might some day find himself spread-eagled on a hospital operating room table as a result of an accident or failing health. If we individually are lucky enough to escape that fate, the odds are even higher a loved one or close friend may not.

Heinlein isn't the only one who has been helped by blood donations. The granddaughter of E.E. "Doc" Smith survived major heart and spleen surgery because over 200 rallied with a pint of their inner sea. My own father enjoyed six fruitful years that might not have been his without regular blood transfusions. Upon reflection, each of you can think of someone who survived because others were willing to share a small part of their common heritage.

Hal Clement, who appeared in our second issue, has given over 85 pints of blood. A.E. Van Vogt, whose blood type is as rare as his imagination, is on call as a donor. Members of the Science Fiction Writers of America (SFWA) have supported blood drives and R. Faraday Nelson and Poul Anderson are among those who have spoken of establishing a SFWA blood bank.

Like any other bank, a blood bank

[Continued on page 17]

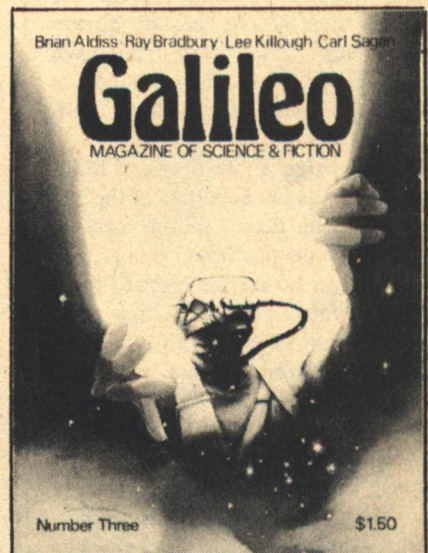
Editorial

Discover your seventh sense... a sense of wonder.

Once upon a time
there was a future....

In that time, there will be
A struggle for the stars,
An assembly of alien allies,
A love spanning time, space, and matter,
A time of play in the fields of the universe;
Humankind no longer alone,
Starmakers,
Space enough for giants.

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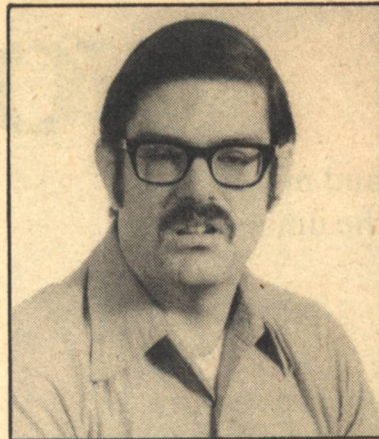
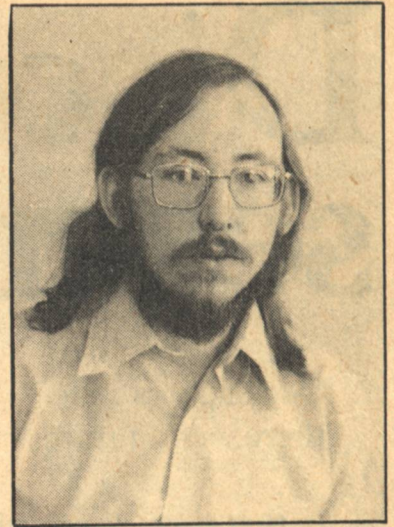
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Pro-File



TOP: Jerry Goodz and David R. Grigg
 BOTTOM: Patrick McGuire and Jacquie Lichtenberg.
 BELOW: [facing page] Tom Barber

The unintentional theme in this issue's fiction is a time-honored one in science fiction: intercultural communication. We are showcasing realists this time and the outlook is not always pleasant, but to quote Jack Williamson (in this issue): "the science fiction of disaster threatens to become a self-fulfilling prediction."

David R. Grigg's "To Speak of Many Things" details the activities of the last man alive who faces, in this case, a decision most people dream about... we had better go no further or we might give something away. Mr. Grigg is an Australian publisher in the field of aviation safety who has been selling his writing since 1975. He has studied at workshops with Lee Harding and Ursula K. LeGuin. His two fantasy novels (*Halfway House* and *Shadows*) have been published in Australia and are now entering the American market. The *Galileo* staff consider "To Speak of Many Things" an important find from a writer who is destined to become well known in this country.

It might be stretching the point a little to say that "Univan and the Wheelies," the first published story of **Theodore Kubaska**, is about intercultural communication. But it is about war, which is

after all a highly specialized form of intercultural communication. Univan, the story's narrator, is a computer, but the story is a lot more fun than you would expect from a tale told by a machine. Mr. Kubaska studies physics in a doctoral program at Rensselaer Polytechnic Institute. "I use proton magnetic resonance," he writes, "to study the motion of hydroxyl ions in hydroxyapatite." Sounds a bit like what we do here at *Galileo*. Mr. Kubaska's chief interest is the application of physics to biological problems. Think of what *that* augurs for the future!

After a couple of years publishing nonfiction (Essays in *The Many Worlds of Poul Anderson* and *The Book of Poul Anderson*, among other items), **Patrick L. McGuire** makes his fiction debut in this issue with "A Sign of Friendship," exploring the implications of life in an international space station. Mr. McGuire has fluency in two languages (English and Russian) and facility with three others. He has just completed a doctorate in Political Science at Princeton, writing a dissertation on political aspects of Soviet science fiction. He hasn't said anything to us about it, but we wonder if an item in his story—an internationally collaborative novel des-

igned for simultaneous publication in English and Russian—does not represent a personal ambition.

"Bolta" by **Jerry Goodz** is a story of diplomatic intrigue revolving around a character of the same name. Bolta is a self-exiled career soldier who has used his time in isolation to develop a rational set of priorities. His character seems to extend well beyond this story and, indeed, Mr. Goodz says he is in the beginnings of a novel about him. Mr. Goodz lives in California with his wife and works in the aerospace engineering industry. He was forty, he says, before he started to write. Now it is a compulsion and he has been selling stories since 1974. He proudly announces that he still enjoys space opera and, seeing the quality of his work, who can argue with him?

"Once by Angels Seen" depicts a relationship between man and animal. **Gordon Eklund** is a major figure in the world of science fiction. He has written ten novels, numbering among them *The Grayspace Beast* and *If the Stars Are Gods*. He shares a Nebula for co-authorship, and has published storied in all the great science fiction magazines. West coast-born and raised, he lives in San Francisco Bay Area with his wife

Authors

and son. He has been selling his work since 1969 and we are glad he sold some of it here. Mr. Eklund is an extraordinary man among artists. He has been known to accept editorial advice at times and once remarked that a less than favorable notice of one of his novels was "the most intelligent review of the book I've yet seen."

"Channel's Exemption" is the second story by **Jacqueline Lichtenberg** to appear in *Galileo*. (Fans can look up "Recompense" in issue #2.) It is part of her 'Sime' series and is indeed an exercise in intercultural communication, as followers of the series will instantly recognize. The Simes, Gens, and Channels of the series have appeared previously in the novel *House of Zeor* (from Doubleday) and, from this limited beginning have spawned a whole cadre of fans and scholars who even publish their own newsletter, *Ambrov Zeor* (with the avowed purpose of answering the questions of fans and giving the author a chance to get on with the work of the second novel, *Unto Zeor, Forever*). We publish "Channel's Exemption" in the hope it will help to quiet the restiveness of Ms. Lichtenberg's fans until the next novel appears in 1978 (and also because we think it is a fine story).

On the non-fiction side, **Peter Weston** is a regular contributor to *Galileo*, making his U.S. debut in issue #1 with an analysis of the robot in science fiction. "Just Thinking Out Loud" is another outspoken criticism, in this case showing his dissatisfaction with an over-used device of the genre. According to Mr. Weston, people read each other's minds too much in science fiction. Living and working in Brighton, England, Mr. Weston is well known to British and European audiences for whom he edits magazines and anthologies, writes critical articles, and inspires general activism on behalf of science fiction. He is currently conducting a British bid for the World Convention in 1979 and is editing the *Andromeda* anthology series (which has not yet reached the U.S. except in boot-legged copies). To make a living, he is a marketing manager in the heavy engineering industry. He has not yet given us the subject of his next article for *Galileo*, but we are all hoping it will be an explanation of how he gets more than twenty-four hours out of a day.

If we have doubled up our features this time in running an article by our "Star Chamber" personality, we are

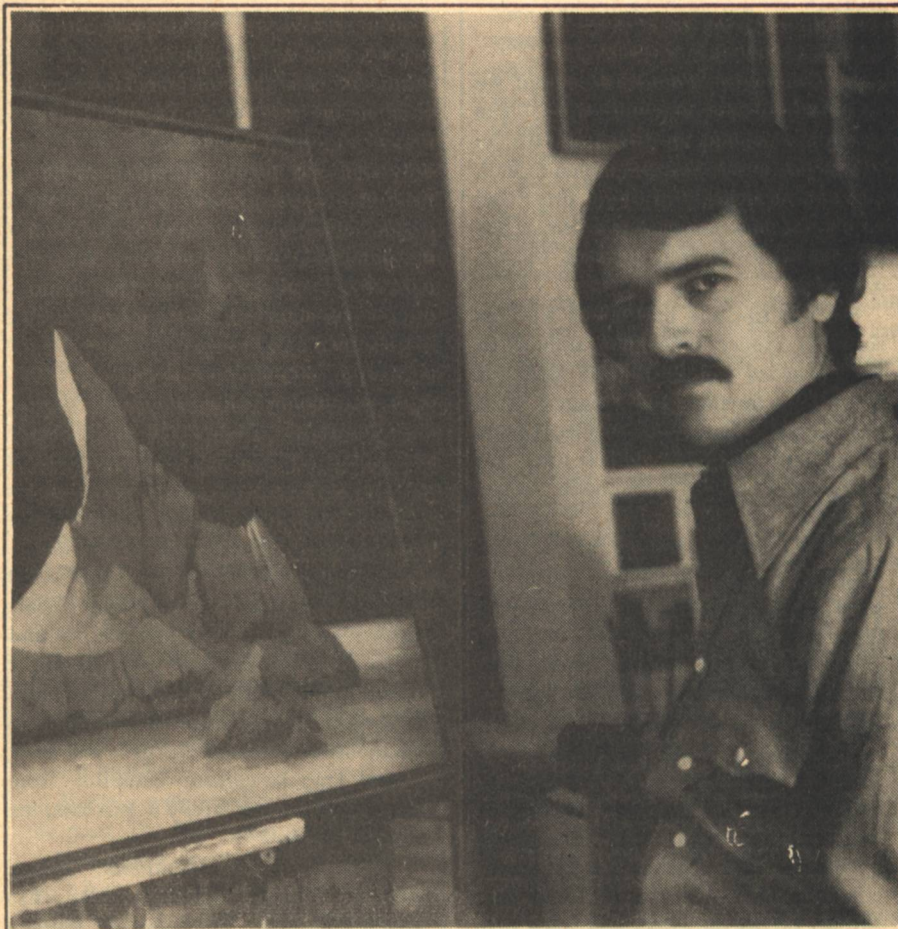
convinced that you're still getting your money's worth...perhaps even more. **Jack Williamson** is the Dean of Science Fiction, a position which has been tacitly conferred by fans and can be considered to be formally confirmed when he serves as Guest of Honor at the Miami Worldcon. Last year he wrote a series of columns on the future which were published locally in New Mexico. "The Futurophobes" is taken from those highly successful columns and embodies Mr. Williamson's belief that the world is taking a dangerous turn but it is not too late for us to save it if we keep our wits about us. There is more to read about Jack Williamson in the "Star Chamber."

"Pro-File" takes a belated look at **Thomas Barber, Jr.** This issue features our fourth consecutive Barber cover and it reflects the artist's fascination with Medieval Europe and the earth sciences. At the age of thirty, Mr. Barber has attained the status of full-time artist. His work has been featured in many galleries, including the Copley Society of Boston, and it has been published on record albums, in magazines, and books. The New England Science Fiction Convention of 1976 voted him best professional artist. A

graduate of the Art Institute of Boston, Mr. Barber says he has been influenced by many artists, but he singles out Claude Monet and N.C. Wyeth for special mention. He says he has always been interested in science fiction and took up painting for it about four years ago, when his first agent suggested it. Science fiction is but one line of Mr. Barber's work, but his characteristic pride in everything he does, his fascination with science and nature, and his romantic view of life, makes it one of his most important undertakings. *Galileo* takes a special pride in Mr. Barber, not only because he established our trademark (you can see it on issue #1), but because he shares some of the responsibility for our success.

—G—

NASA hopes to satisfy some of us dreamers. They have designed a giant observatory (High Energy Astronomy Observatories—HEAOs) to study pulsars, quasars, exploding galaxies, black holes (see next issue for a special new theory of black holes—are they universes within themselves?) and other romantic puzzles of our expanded homeland. Watch out for them: HEAOs.



Jack Williamson

Futuro-phobes

The Leaning Tower: Opinion

The new world-being may survive and triumph, or it may die in the agony of birth.



IS OPTIMISM DEAD?

Not yet.

Sick, maybe, with what we may call futurophobia. The futurophobes are people driven with the paranoid obsession that science is evil, that technology is a sinister trap, that our future is doomed. Their despair has harrowed us all, but I think they're wrong.

Hazards-to-come have been a major staple of science fiction ever since H.G. Wells earned his fame with scenarios for our extinction that ranged from nuclear war through invasion from Mars to planets colliding. As fiction, his nightmares made memorable entertainment.

Unfortunately, now, the science fiction of disaster threatens to become a self-fulfilling prediction. Paralyzed with futurophobia, we can fail to save ourselves. Before he died, Wells himself lost hope for better times to come.

His early fiction had led him, in his own phrase, to "the discovery of the future." He published *The Time Machine* in 1895; by 1902, he had invented futurology. Still moderately hopeful in 1905, he gave us a thoughtful blueprint for a better world in *A Modern Utopia*, but as the years and wars went

on, his faith slowly faded.

From the beginning, he had been keenly aware of cosmic limits to human progress and the narrower human limits he dramatized so powerfully in *The Island of Dr. Moreau*. Early on, he gave up his literary art for his long campaign to warn us and train us for citizenship in the world-state that he saw as the only way to save us. He died a futurophobe, confessing the failure of his life-long effort in a last bitter little book, *Mind at the End of its Tether*.

In the decades since his death, futurophobia has kept on spreading. It may yet be fatal to us all, but we still have a chance to understand it, to analyze its etiology and moderate its symptoms, even to immunize ourselves.

Changing the metaphor, our racial danger—but also our dazzling opportunity—lies in the fact that the life and mind of Earth is right now making a quantum jump, comparable to the early evolutionary leap from single-celled to many-celled forms of life, or to the more recent leap in cultural evolution from the simple animal family to the complex human society.

What do such evolutionary jumps involve? Three factors, I think, are worth comment. The evolving units—

for example, the cells—become specialized for different vital functions. Better communication—for example, a newly invented nervous system—helps them cooperate. The resulting new forms—for example, the metazoans—can find new ecological fields. The early protozoans were confined to the sea, the metazoans were able to conquer dry land.

The quantum jumps in the evolution of human culture have come from such inventions as language, writing, and printing, each step creating larger and tighter-knit societies. Our present leap is due to a whole avalanche of advances in electronic communication: the telegraph and the telephone, radio and TV, the synchronous satellite and the computer.

The new social unit, as Wells foresaw, is going to be global. Like it or not—the futurophobes don't—we are all about to merge into a single cultural organism. That's why our situation is now so critical. The old alternatives, utopia or nightmare, have become our world dilemma. The new world-being may survive and triumph, or it may die in the agony of birth.

Our survival is uncertain. For nearly a century, since Wells began to write,

science fiction has been elaborating the perils he perceived. The cosmic dangers will always loom. A giant meteor could strike the Earth tomorrow. A single microscopic mutant cell could multiply and kill us all. An actual UFO could land to sterilize the planet for the arrival of some higher life.

The human dangers, far more likely, were long familiar to us from a thousand dystopian stories before they broke into the headlines. The final war, nuclear or biological, will lead to racial suicide. Irreversible pollution. The trends of population increase and planetary waste, sensationalized in the Club of Rome study, *Limits to Growth*. The most alarming element, however, is our own futurophobia.

The future has always eroded things as they are. In earlier times that scarcely mattered, because the effects of time were barely visible. Each new generation copied the last; the ancient pressures of famine and pestilence and war kept populations small. Once invented, a new axe could be the latest of tools and the deadliest of weapons for many thousand years.

The impacts of change are heavier now, growing more explosive year by year. Most of the scientists who ever lived are still alive, busy creating the tidal wave of new technologies that threatens us with future shock. Most new inventions are already obsolete before they can be manufactured, and most of us at work will find our first-mastered occupational skills out of date long before retirement.

Swept into the flood of the future, we're losing all our old anchors: the families we loved, the crafts we learned, the faiths we knew. Most of us manage to accept time and change, but too many fail. They become the futurophobes.

They're all around us, their psychosis not yet fully diagnosed, their contagion spreading. They haunt our universities; in his revealing study, *The Two Cultures and the Scientific Revolution*, Sir Charles Snow called them "the traditional literary academics." We often find them in seemingly harmless guises, often as science fiction writers, but they also hold high places, controlling government, starving the space program, paralyzing energy development, crippling every sort of research—all their activities ironically inviting the terrors they dread.

Most of them are sincere. Their errors are hard to expose, because what they fear is real. Global ruin is shock-

ingly possible. The futurophobes, clouding the issues with their hysteria and paralyzing every sane response, can make it inevitable.

Our world dilemma, of course, has always been the stuff of science fiction. Wherever we pick up its history, we can find both optimists and pessimists for the usefulness of knowledge and the shape of things to come: Plato, the early optimist, designing an ideal Republic—Aristophanes, the contemporary pessimist, poking fun at all philosophers.

The readings for my own science fiction class are sometimes chosen to illustrate that perennial debate. In popularity and literary power, I think the pessimists have the edge: Swift's Gulliver, invented to satirize man's misplaced pride in his own reason; the early Wells, Swift's disciple. Zamiatin and Huxley and Orwell followed Wells's gloomy track, as did Frederik Pohl and Harlan Ellison. And even, sometimes, myself.

The optimists have always had a harder literary task, simply because, seen from outside, ideal societies look pretty dull. Without the presence of evil, or at least some believable threat of it, story interest tends to die. Yet optimistic fiction can be found. Unlike my own too-benevolent humanoids, Asimov's robots are really useful future machines. Heinlein, most clearly in his great juveniles, shows human civilization carried to the stars. Clarke follows the evolution of future men to supermen.

Clearly, the optimists have been losing ground, with faith in progress and human perfectability declining ever since the eighteenth century. Writing science fiction for the past fifty years, I have seen a dismaying change—the pandemic spread of futurophobia. Most stories of the 1930's ended on a confident promise of human victory. More and more, since Hiroshima, we've been depressed by fiction of defeat.

In defiance of the futurophobes, this paper is a plea for a new sort of faith in a new sort of future. From the protozoan point of view, with sunlight as deadly as the air, the dry lands can't have been inviting. But, if we manage somehow to complete our new quantum jump without some dire collapse, I think we won't turn back.

There's a price, of course, that must be paid. The individual protozoan gave up the right to swim where it chose, and we face corresponding sacrifices of individual freedom and personal pri-

vacy. Much as I enjoy them now, I see limits put upon them in the Electronic Age. Technologies will exist—in fact, they already do—to monitor and shape the behavior of every citizen.

I think such technologies will be used. Total individual freedom is simply not compatible with the existence of refined plutonium or even with the private possession of automatic weapons and plastic explosives. Terrorists enough have demonstrated that.

National independence must also go, as Wells foresaw. Once the favorite human recreation, the good old game of war has now become too dangerous to play. National competition must yield to sanely planned and well-controlled global cooperation, in use of resources, in control of population, in the whole care of our planet.

Though the costs may look high to us, I think they must be paid. We can't stop long in the middle of a quantum jump. Either we make the transition to a global human unity, or else we don't. If we don't, we'll lose more than certain civil liberties. Most of us will lose our lives.

The outcome is not yet clear. The futurophobes will be able to hold back the tides of change from time to time, here and there. They can cut funds for space, stop the building of a power plant, close a laboratory, outlaw the teaching of organic evolution, forbid abortion. But they can't easily un-invent the future.

The breeder-reactor may be stalled in the United States, but construction of the 1,200-megawatt Superphenix is about to begin in France. If the American space program is starved, the Soviet program may be better fed. If the books are burned here, memory can rewrite them there.

Yet, in spite of science and its culture, the futurophobes may win. They may keep the nations arming and the populations growing. Blind with their own hysteria, they may trigger the catastrophe they fear: a world collapse in the coming century that too-probably would leave perhaps eight or ten billion human beings unpleasantly dead and only a handful of shattered survivors skulking in the ruins.

An ugly outlook.

PERHAPS I'M half futurophobe myself, because I almost gave up this paper here, when I found that I seemed to be campaigning for the evolution of a hive-like superstate of specialized and

regimented human insects—for the frightening future world so vividly foreshadowed in Wells's *First Men in the Moon* and reflected so chillingly and often since he wrote, by Zamiatin, by Huxley and Orwell, by so many current writers.

Not all futurophobe, however, I decided to go on. Though I can't escape an uncomfortable conviction that the technological society will finally require a stronger social organization than we are accustomed to, with less individual freedom than I like, I look for what comfort I can find in the fact that values and customs change.

The universal human problem, and consequently the basic theme of most literature, is the conflict between the individual and society. Born naked individuals, we must all join society or die. The conveyor of our social values, literature commonly functions to shape us into social beings; more rarely, of course, it can criticize society.

In literature or life, we never reach any final solution to this old conflict between our selfish needs and social duties. The best we can do is compromise, and from person to person and from age to age, the terms of compromise can change. Each past evolutionary leap has enlarged and elaborated the social structure at some cost to individual liberty—a cost commonly more than balanced by a rise in individual benefits.

Evidence: peasant farmers all over the world keep leaving the relative freedom and simplicity of life on their small holdings to seek the higher pay and the greater security that come with the specialized labor and the tighter discipline of assembly-line jobs. The futurophobe is bewildered and appalled by this readiness to trade all their ancient cultural values for technological benefits, but his shocked protests never send them back.

Classicism and romanticism are standard literary labels for opposing attitudes toward this old tug-of-war between the self and the group—terms, however, to be taken with caution, because they have been used with so many contradictory meanings.

The classicist, as we apply the label here, is the person who accepts and respects society. His values are public, supported by reason and tradition. He sees each new individual as weak or incomplete or even born innately evil, in need of training and perhaps salvation to fit him for his proper social role. The

good society, the classicist believes, exists to benefit its members.

The romanticist, on the other hand, puts the individual first. His values are private, sanctioned by his own emotions. He questions the truth of every tradition and the use of every social institution. He sees each new individual as born good but in danger of corruption or destruction by a bad society.

Democracy, assuming the wisdom and goodness of the common man, is the politics of the romanticist. The classicist prefers government by some select group, such as Plato's philosopher-kings, trained and dedicated to serve and preserve the whole social system.

If there really is a pendulum swing between romantic and classic ages, as Curt Sachs suggests, I think we are still in a romantic era. We still trust and praise democracy. We uphold every individual liberty, with more care for the rights of the criminal than for the society he injures. We challenge custom and dissolve tradition. We suspect or betray every social organization: the family and the church, the party and the corporation, the nation and the United Nations.

Already, however, the pendulum of change has begun its swing back toward classicism. All over the world, democracy is in trouble. Free nations keep sliding into dictatorship or socialism. Walter Prescott Webb, in a stimulating and disturbing book called *The Great Frontier*, has made an ominous forecast. He suggests that political democracy, like private capitalism and protestantism in religion, was a gift of the new lands opened to Western culture in the era of Columbus and Vasco da Gama. With that new wealth depleted and the new space now crowded, the age of democracy may be ending.

So Wells believed. A disciple of Plato and a critic of democracy, he called for a revolutionary "Open Conspiracy" to set up the utopian world-state he hoped for. No republic, it was to be ruled by the "brotherhood of Samurai," a self-selected group of able individuals dedicated to the public good.

Sometimes my own faith wavers. Though I enjoy our present freedoms far too much to press for any restriction, I find it hard to trust the wisdom and the unselfish foresight of the common man and the politician who gets the common man's vote. I'm afraid he doesn't really understand all the difficulties and the dangers of our evolutionary leap.

With catastrophe looming, he seems no more inclined to solve our energy problem here in America than to control the population crisis in India. With racial extinction as the penalty, he seems no more willing than the commissar in the 'people's democracies' to halt the production of nuclear arms.

Yet I cling to shreds of hope. In the real world, though we never discover Wells's selfless Samurai, we do find at least a few successful democracies still surviving, their citizens educated to understand their duties and devoted to the preservation of freedom.

Our electronic arts can have a double effect. On the one hand, they certainly make for tighter social controls and limited individual liberty. On the other, however, they offer a thousand novel technologies for educating everybody. With their aid, we may at last be able to inspire and train a new race of citizens fit to defend their own rights under a world republic.

If our culture does survive, that global state should come to seem a splendid haven from every terror the futurophobes have imagined, worth whatever we must sacrifice. Our evolutionary leap to a new quantum level should finally be perceived as the supreme achievement of our kind, opening unknown horizons as dazzling to us as the sunlit sands must have been to the first timid creatures that crept ashore. Electronic Man should be liberated into space from Earth, as the old metazoans were freed from the sea.

Out in space, we may recover the personal freedoms we had to give up here. I see hope for that, in the shifting conditions of evolution. As each quantum jump forms a larger social unit, the evolutionary pattern changes. Competition between the fusing elements has to be controlled—in the human organism, a rebellion against such control is what we call cancer. It is only the new and greater units that remain free for variation and the struggle for survival.

In our own history, civilization long ago checked the evolutionary selection of the individual; physically, we are now probably inferior to Cro-Magnon Man. More recently, the items selected for survival have been social groups: tribes or races or cultures. When the whole globe becomes a single unit of cooperating elements, the process will shift again.

Stalled on Earth, evolution can
[Continued on page 17]

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Or does it sound vaguely familiar?

It should! For this has become about the most over-worked of all science fictional plots and yet authors still seem to feel the need to grind out even more variations, as if the writing of a 'telepathy' story is the price of admission to some sort of exclusive club. It has been done by every major writer in the field and the truly 'classic' treatments of the theme are now twenty or thirty years old, but still newcomers aren't deterred from going over the same old ground in the fond belief they're doing something new—just watch them.

Frankly, it may be time for a 5-year closed season on the whole idea of telepathy, ESP, and *psi*-powers in general.

12 GALILEO

Having said such rude things, there is of course an immediate need for qualification; it *is* possible, barely, to say something new, as has been proved quite recently by Bob Silverberg and Joanna Russ, to name only two. But too often telepathy degenerates into just a convenient prop, something to give useful advantage to hero or villain, an easy way out. Thus science fiction has become overrun with whole hordes of mind-reading aliens, paranormal poltergeists, and evil telepathic mutants from Atlantis.

The temptation is sometimes too great for even the most self-respecting of authors to resist. An excellent example is given in Damon Knight's pioneering critical volume, *In Search of Wonder*, where he discusses John Wyndham's *Re-Birth*. Here we have, says Knight, one of the most believable After-the-Atom societies on record, an ultra-Puritan frontier community where anything or anyone even a little bit different from the Norm must be destroyed without mercy. And then our young hero, David, finds his small girlfriend Sophie has a sixth toe on each foot. Let Knight use his own words:

"More's the pity Wyndham failed to realise how good a thing he had. The

sixth toe was immensely believable and sufficient, but he has dragged in a telepathic mutation on top of it; has made David himself one of the nine child telepaths, and hauled the whole plot away from his carefully-built background into just one more damned chase with a rousing cliché at the end of it."

In other words, *Re-birth* wasn't really a 'telepathy' story at all, and its introduction merely derailed the true plot. That's the classic case, but the same test can be tried on other well-known titles; what are they fundamentally *about*? For instance, it can be argued that the Kuttners' famous novel, *Mutant*, is primarily about intolerance and the telepathic nature of the Baldies is almost incidental—their difference from the rest of humanity might as well be something much more mundane, like skin-colour perhaps, without altering the essential message of the book.

So which are those truly 'classic' treatments of telepathy?

First, do we know exactly what we are talking about? For as current mythology would have it, telepathy (or TP) is only one of a family of related parapsychic powers, known collectively as *psi*. These include precognition, psycho-

Thinking Out Loud

kinesis (PK), levitation, and so on. In science fiction, these boundaries are sometimes blurred, authors are imprecise in their definitions or often confer the whole mess of abilities upon their unsuspecting characters.

The less-common term 'ESP' stands for Extra-Sensory Perception, and Alfred Bester at least uses it synonymously with telepathy, although generally it also has overtones of clairvoyance and precognition.

But to inject a note of unwelcome reality for a moment, no solid evidence has been found for the existence of any of the above list. After all those years of card-guessing, Dr. Rhine at Duke University had little to show except for what might have been isolated statistical anomalies. Apocryphal tales abound to support precognition, such as the lady who 'foresaw' the sinking of the *Titanic*, but this is hardly scientific proof; much the same situation exists with regard to the levitation exploits of the Italian medium Eusapia Palladino and the Scotsman D.D. Home during the last century.

To a considerable extent, science fiction has swallowed its own propaganda; for decades, writers have striven to argue a plausible case for *psi*-powers

and have done it so well that it's easy to forget the whole edifice may be a house of cards, a clever series of speculations with no real substance.

Clearly, though, most SF readers want to believe in *psi* and it's not hard to see why. We all know the advantages that could come our way with telepathy and through the stories we can vicariously experience the delicious sense of power the ability would bring.

There's an evocative scene in Bester's novel, *The Demolished Man*, where candidates for the Esper Guild dream their fantasies:

"...Read minds and make a killing on the market...Read minds and know what people really think of me...Read minds and know which girls are willing..."

And more altruistically, we can visualise the millenium which universal telepathy would bring, with the whole of mankind in perfect communion, purged of all causes for distrust and hatred. As John Brunner says in his book, *The Whole Man*, "No telepathist could consign fellow-beings to a gas chamber, or annihilate them in atomic war."

Let's for convenience, classify TP-stories into three broad categories of plot-situations. The first has already been

mentioned, instances where telepathy is just tossed into stories which are really about something else entirely. The second category contains all those accounts of a protagonist who discovers he is a lone telepathic freak misunderstood by the world; while the third situation takes off from there, begins with a telepathically-oriented society already in being and strikes out in a new direction entirely.

We've already seen that *Re-Birth* is a perfect example of the first class, but in there with Wyndham's novel is a whole batch of good and not-so-good stories where TP-powers are used as a piece of double-talk, as a quick way of communicating with aliens, or as a device to simplify plot complications.

Take Eric Frank Russell's *Call Him Dead*, a fast-moving 'alien invasion' yarn with a psionically-gifted hero who just happens to be around at the right place at the right time. Or John Dalmass's *Analog* serial, "The Yngling," where telepathic Vikings are running around post-collapse Europe. Even Poul Anderson's excellent "No Truce With Kings" has a corps of Espers who tend to detract from the main substance of the story.

But it is the second group of plots

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which has been the most over-worked. These are the ones where Our Hero first realises his powers and then spends a great deal of time thrashing around while he considers what to do with them. Dare he risk the hostility of a non-telepathic world? Will anyone believe him, even? Should he remain in hiding for fear of being exploited by self-seeking power groups? In the end, he usually escapes to found a new super-race with a telepathic mate who has turned up in the penultimate chapter.

There's nothing actually wrong with this idea in itself, except that it has been done so many times before and has grown stale through sheer repetition. It can be traced back at least as far as Olaf Stapledon's *Odd John* (1935), which, although not being a 'telepathy' story alone, set many of the *motifs* from which later traditions have developed.

Odd John is the tale of a true mutant with far greater intelligence than normal and an entirely strange perspective upon the world. He is *homo superior*, and telepathy (and a little PK) are concomitant powers of his developing super-brain.

Stapledon describes the way John gropes towards an understanding of his true nature, gathers his small group of similar freaks, and retreats to a remote island to begin their new race. And yet there is one feature which later writers have chosen not to emulate, for John is not a character with whom anyone can identify. He is completely repellant, contemptuous of humanity and possessing his own moral code which to us is outrageous.

The 1950's saw a whole crop of Type II stories. Three in particular are worth close examination. These are James Blish's *Jack of Eagles*, Wilson Tucker's *Wild Talent*, and Walter M. Miller's short story, "Command Performance."

Jack of Eagles (1952) is comparatively early Blish and unfortunately is something of a mess so far as being a reasonably coherent novel is concerned. It opens extremely well but then the pace becomes faster and faster, plot-complications multiply to include the FBI, enraged gypsies, gangsters, not one but *two* secret psychic organizations, mysterious gadgets, parallel universes, and the kitchen sink.

Nevertheless, Blish is very convincing at first, as his hero, Danny Caiden, reviews all the available evidence in favour of *psi*. All the likely sources are consulted, from the Psychic Research

Society, The Fortean Society, through to the Parapsychology Department of the local University. Blish also gives a long list of books, titles by Dr. Rhine, Dunne's *Experiment With Time*, and a number of others. The net effect is to set the stamp of truth to telepathy; the reader feels these 'Authorities' have proven it must exist and therefore Blish's hero is given added credibility.

Unfortunately, the author becomes too busy keeping all the balls in the air to be able to take time out to examine the consequences of Danny Caiden's new-found powers. In a pell-mell ending, the hero surrenders to the FBI, gives his secret to the world, and dances off into the sunset with the girl.

Wild Talent (1954) delivers what Blish only promised. The early sequence of Tucker's book is quite similar, as Paul Breen's latent abilities slowly become evident, even to the extent of consulting much the same 'Authorities.'

But Tucker omits the melodrama, and quite early in the novel his hero turns himself over to the FBI. From there onwards, new ground is broken as Breen discovers the ambivalent attitude the normal world has towards him. Despite their greed for the knowledge he can bring, his captors are also afraid, and we can sympathize with their fear; after all, it's all very well to have TP-ability oneself, but what if someone else reads *your* mind?

Just after he makes himself known there is a brief dialogue with a secret serviceman:

" 'Mr. Breen, I can't help feeling sorry for you.'

'Why sir?'

'Because in the eyes of those who will know you, you are going to be the most hated man in the world. I'm sorry for you, Mr Breen. It is an unenviable position.'

Significantly, the front-cover blurb on the Bantam edition quotes a review from the *San Francisco Chronicle*: "A danger greater than any manipulation of atoms," which seems to bear out Tucker's gloomy analysis.

And so the U.S. government tries to use its lone telepath as a secret weapon, kept under lock and key. Eventually, however, Breen escapes and sets off with his girl-friend to found a secret breeding-group on a remote island. He has tried to be honest and open but has found it impossible to live under the terms laid down by a non-telepathic world.

This situation is turned neatly on its head in Walter M. Miller's moving "Command Performance" (1952). For Lisa Waverly is a perfectly normal suburban housewife of 34 until suddenly she finds herself in mental contact with a young male student.

" 'Don't you realise, Mrs. Waverly, that we are mutants perhaps?' he asked politely.

'No!' she screamed. 'I'm happily married and I have three children and a place in society! Don't come near me!'

So much for any presumed automatic comradeship between telepaths! Even though Lisa has the power, her whole life has conditioned her to reject it in horror. The student has the attitude we expect and wants to study the nature of the TP mutation and perpetuate it by having children; she will have none of this and irrevocably shuts out his frightening presence, only to wonder at the very end of the story whether she has made the correct decision:

"And for the first time in her life she felt the confinement of total isolation and knew it for what it was."

These are really the three basic reactions to telepathy; the protagonist offers it openly to the world as in Blish, goes into hiding as with Tucker, or rejects it completely as did Miller's unwilling lady. Being an ingenious bunch, however, science fiction writers have worked a few twists on these bare bones and some further stories are worth noting, in particular, the short pieces "Crazy Joey" and "Journey's End," and the novel *Dying Inside*.

IN "Crazy Joey," authors Mark Clifton and Alex Apostolides show a sad little eight-year old boy who is being reduced to a nervous wreck because he is a perfect telepath, able to read every unspoken thought of his parents and classmates down to the subconscious level and *unable to shut them out*.

Naturally, he cannot understand why he is being bombarded with so much emotion, the suppressed frustrations and hostilities of everyday life, why he gets called a liar for innocently repeating things he has 'heard.'

It is a perfect cameo of a story, told from a Joey-eye viewpoint and accurately conveying the hell that telepathy might be in a normal world.

Poul Anderson's "Journey's End" (1957) is an ironic love story in the same vein; hero has had a difficult childhood because of the continued barrage of

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uproar from unshielded minds, but he has learned to cope with it, just about, and one day detects the presence of a telepathic female, the only other he has ever found.

Joyously they meet, no longer alone, with the resolve to found a new race and put right all the sins of the world. Only...they are irresistibly drawn to look deep into the darkest recesses of each others' minds and, despite themselves, are shocked at what they see and are outraged at the violation of their own privacy:

"A boy and girl went hand in hand.

"The thought hung cold under the sky, a single thought in two minds.

"Get out! I hate your bloody guts!"

Robert Silverberg's hero, David Selig, has it easy by comparison in *Dying Inside* (1972). He can "stop down the input and do a certain amount of fine tuning," thus avoiding the sheer sensory overloading which swamped Joey. He has never confused spoken communication with TP pickup and has never made the mistake of drawing the attention of the authorities to the existence of his peculiar talent.

Almost for the first time in this type of story, Silverberg diverges from the standard pattern laid down by *Odd John*. In the intensely subjective musings of Selig, we come to understand that even Tucker's balanced prose concealed a touch of melodrama completely lacking in this later novel. For instance, our hero doesn't give a damn about perpetuating the telepathic gene for the ultimate betterment of mankind, and neither do the other telepaths he meets during his travels:

"You're the fifth. Two women, three men."

'Are you still in touch with the others?'

'No.'

'What happened?'

'We drifted apart,' Nyquist said. 'What did you expect? That we'd be clannish? Look, we talked, we played some games with our minds, we got to know each other and after a while we got bored.'"

And most of all, Selig differs because he only becomes happy as he loses his gift, as his powers slide away and he feels the closing of the gulf between the rest of humanity and himself. Like Lisa Waverly, he is happier to be an ordinary member of the crowd rather than the vanguard of *homo telepathis*.

Before leaving behind these Type II

stories a few other points need to be made. The first comes as a question: how many other stories can you recall having strong similarities to those mentioned? Almost certainly you can list a dozen more with little effort, proving the point that enough is enough and writers should find something more original upon which to speculate.

Another comment concerns the somewhat worrying tendency authors show in not seeming able to leave well enough alone. For example, in *Jack of Eagles*, our hero possesses not only TP but levitation, precognition, and teleportation as well. Even in the generally disciplined *Wild Talent*, the protagonist not only develops limited PK but finds he can influence others by planting thoughts in their brains and ultimately learns to control them against their will, against their will.

What's wrong with that? Well, the objection is that when writers are so quick to load down their heroes with additional powers, the whole thing becomes dangerously close to a mere exercise in wish-fulfillment, and the result might as well be called 'magic.'

The last note concerns a remarkable book which really fits into no neat pigeon-hole but which must be mentioned here simply because any discussion of *psi* would be incomplete without it. The novel is *More Than Human*, by Theodore Sturgeon (1953).

It's certainly about parapsychology; that much is clear, even though the author uses none of the familiar jargon until almost half-way through. Sturgeon brings in telepathy, PK, and teleportation, one ability per individual, complete with unique descriptions of what each can do. But no one else has had the audacity to propose a sort of miniature hive-mind, when these wildest of wild talents get together to form a composite super-being, *homo gestaltis*. All the rules and restrictions of the usual plot-situation simply do not apply in this extraordinary book; Sturgeon is unique.

BUT WHAT HAPPENS if society ever does accept telepathy in some form or another? This is the main preoccupation of Type III stories.

Almost the first of its kind was A.E. VanVogt's *Slan* (1940), but true to the author's usual form, this is almost entirely action with little said about the relationships between the slans (telepaths) and normals, save that they cannot interbreed and have been

fighting for World Domination for 1500 years.

Much more sane are those titles in which telepathy has been shorn of superstition and put to useful service as a tool—no more—capable of being controlled. Two fine books with this approach are John Brunner's *The Whole Man* and Robert Heinlein's *Time for the Stars*.

In *The Whole Man* (1965), Brunner's hero is a curative telepathist, whose talents make him invaluable in the treatment of the mentally ill; he is able to look into their minds and put right their psychoses. Other uses for the power suggested by the author include diplomat and peacemaker, arbitrators of disputes, and crime-busting super sleuths. Generally, the few individuals with TP ability are regarded as pretty valuable assets to the community, and a U.N. propaganda campaign is mounted to ensure their acceptance by the populace at large.

A similarly common-sense attitude is adopted in Heinlein's *Time for the Stars* (1956), where it has been found that some pairs of identical twins have a sort of 'resonance,' that they can communicate with each other through an as-yet unexplained method. Pragmatically, Heinlein's characters utilise this mental telegraph as a way to keep in contact with exploratory starships which would otherwise be faced with delays due to the finite speed of radio waves; telepathy apparently is instantaneous in effect.

Heinlein's attitude is entirely down-to-earth:

"We did subvocalise the words silently as it helped in being understood. Early in the summer we had tried to do without words and read minds directly but it did not work. Oh, I could latch on to Pat but the silly, incoherent rumbling that went on in his mind in place of thought was confusing and annoying, as senseless as finding yourself inside another person's dream. So I learned not to listen unless he 'spoke' to me and he did the same. There was none of this fantastic, impossible popular nonsense about instantly grasping the contents of another person's mind; we simply 'talked.'"

However, once society begins to put telepathy to work, it will inevitably begin to change society, particularly as the number of adepts grows. If a *Slan*-type conflict can be avoided, the result may be something like the setting of

The Demolished Man (1953).

Alfred Bester's splendid novel probably succeeds as well as anyone ever will in describing in words the private lives of telepaths. Here the minority group has fully emerged and is organised into the Esper Guild, a sort of professional trade union, which looks after their interests and, at the same time, enforces upon them the restraints and obligations necessary to protect the non-TP majority from fear of exploitation.

It is fascinating to see the way Bester's book both vindicates and disproves the hopes of the persecuted 'Wild Talents' of Type II stories. For even in this world of 'Peepers,' there is still crime and injustice (though no murder for over 70 years), still a need for juries and hard legal evidence even though the Prefect of Police for New York is a 1st-class Esper and *knows* beyond a shadow of doubt that his man is guilty. The world, adapted to the presence of the telepaths rather than being overthrown, apparently does not feel in the least threatened by the 100,000+ Guild members, while they, in return, are happy to be integrated rather than having to withdraw to some remote part of the globe.

Bester's garden of roses contains one or two ungrasped thorns. How do we get there from here, for instance? What happens as the Guild's 'Eugenics Plan' continues to breed telepaths until at some stage the old non-TP race will be faced with, and eventually supplanted by, a majority group of mind-readers? There could perhaps be some potential for conflict in that situation.

A long way ahead, the boot may eventually be on the other foot and present-day humans will be the rare freaks. Just such a state of affairs is shown in a novella from *If* by Mari Wolfe, "Homo Inferior" (1952). Little Eric is only four years old and doesn't realise he is different until he meets other children for the first time:

"They didn't say anything. They just watched him, very intently.

"The bigger boy laughed. He pointed at Eric and laughed again and looked over his shoulder at his companion. 'See?' he said, pointing at Eric. 'He can't.'"

For in a telepathic world, the mute observer simply doesn't know what is happening. Ultimately, this may produce a society entirely beyond our present comprehension, which of course makes it very difficult for writers to

Peter Weston

convincingly depict such a community.

Joanna Russ has perhaps gone about as far as she possibly can in this direction with her bewildering 1970 novel, *And Chaos Died*, which draws out to full-length the incomprehension felt by Eric. This is a fully telepathic race seen from outside, and to us, its affairs are meaningless.

The ultimate exploration in parapsychology must be credited to Arthur C. Clarke, who several times has speculated upon man's future evolution and in *Childhood's End* (1953) goes considerably beyond Stapledon to show a new telepathic hive-mind of mankind and its total disregard for all things merely human. In a cosmic finale, Clarke suggests that the whole may be greater than the sum of its parts and yet even beyond *that* unthinkable entity may be some sort of celestial Overmind, composed of pure thought alone.

This is science fiction at its very best and most imaginative, in which *psi*-powers are a long way removed from the cheap parlour tricks of Peter the Poker-Player who has learned to play winning hands. Few others can be expected to approach the stature of a Clarke or a Sturgeon, admittedly, but perhaps there have already been more than enough lesser performances.

—G—

FUTUROPHOBES

[Continued from page 10]

continue out in space. The lunar and martian colonies, the orbital islands proposed by Gerard K. O'Neill, can become new competing units. They will vary in personal freedom permitted, in degrees of democracy. Creativity being an individual gift, freedom to be creative should aid survival.

A strong social discipline will of course be required—a lone romantic rebel, planting explosive on the cylinder wall, might let the air out and kill the whole space colony. Yet the outcome can be the evolution of a new sort of democratic culture, at a level of development that only science fiction can now envision.

—G—

EDITORIAL

[Continued from page 4]

operates on the premise that one has to make a deposit before taking a withdrawal. Yet less than 3% of the nation's populace make deposits, and the country's blood banks are habitually either overdrawn or bankrupt. As blood

is a living substance, it must constantly be replenished. To counter that and keep this tide of life in tune with the ebb and flow of human need, more—many more—have to give.

We not only support Heinlein's proposal, we think it can be taken one step further. SFWA members could insist that bloodmobiles be established at conventions as a prerequisite for their attendance. A very modest fee, actually, and one which makes a great deal of sense when one considers the distances traveled to conventions alongside recent highway accident statistics.

In fact, there is very little about being a blood donor which doesn't make sense. It is probably one of the most intelligently selfish actions anyone can take.

If you agree, do something about it. Write to the SunCon (P.O. Box 3427, Cherry Hill, NJ 08034) or any other convention in your area and let them know how you feel.

A large enough response could help turn the tide on the constant shortage of blood. Your pint can make that inner sea into something much more significant than an editorial metaphor. Think about it. Do it—now.

—G—

SSOAR

[Continued from page 23]

with EARTH/SPACE. The processing equipment is standard, and is used over and over. Once the raw materials arrive, payload specialists pick up the material at the airfield; bring it to the payload room and place it in the processing equipment; and attach the equipment to the standard payload compartment. The compartment is then brought to the SSoar vehicle which is being readied for launch, and is bolted into the payload bay. Following launch and return, crews remove the payload and ship it back to the owners on the next flight out. In this manner, EARTH/SPACE is primarily involved in providing an environment for the payload. The user has come no closer to the launch site than his closest airfield of delivery.

* The Enigma of Booster Recovery—Ballistic or Winged?

**BETA, A Single-stage Reusable Ballistic Space (A & A Journal)

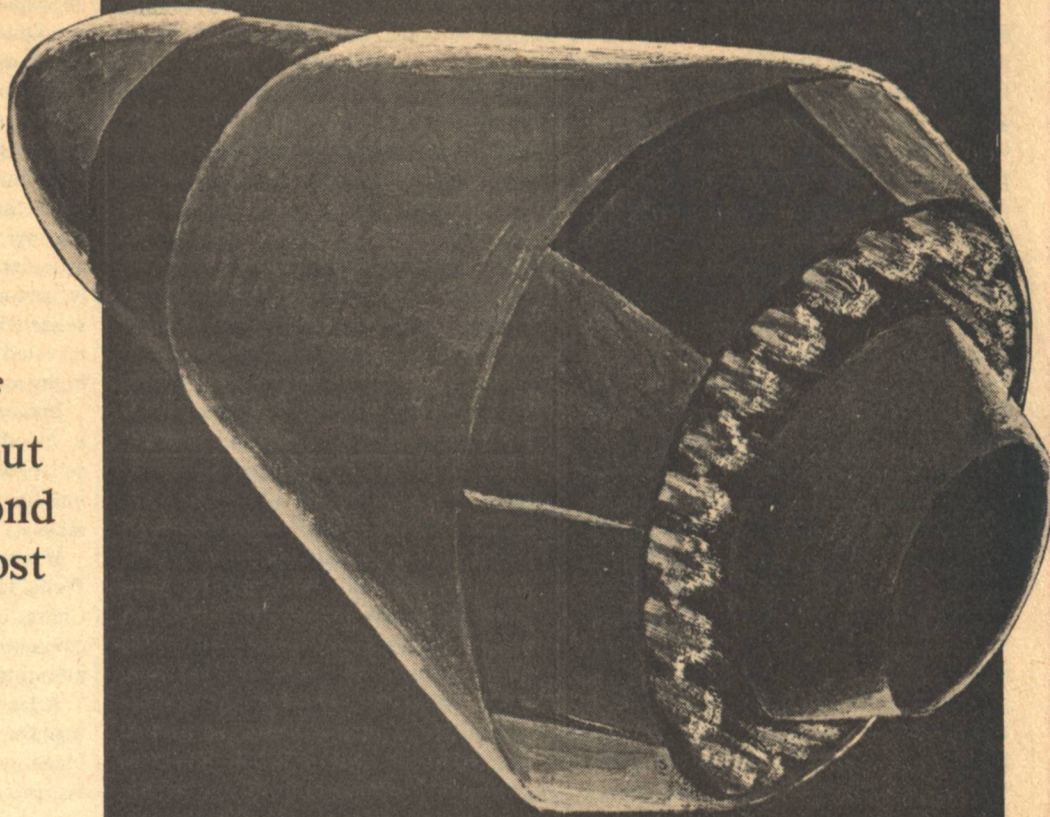
—G—

Odd is the gravity of Mars, holding only the minutest traces of a carbon dioxide atmosphere but strong enough to urge tidal grooves from its moon, Phobos (*New Scientist*, May 19).

GALILEO 17

SSOAR

Inefficient use of technology has put space flight beyond the reach of almost everyone.



MAN HAS FLOWN to the moon and back, and has launched Satellites to link one side of earth with the other. But for the most part, man is still restricted to earth. He is not free to roam and work in space as he chooses.

Inefficient use of technology has put space flight beyond the reach of almost everyone. Vehicles built until now have taken many years to develop, and cost billions to produce. As a result, private organizations have been able to play only a minor role in opening up space.

What is needed is a simple, low-cost vehicle which can be brought quickly into operation. This simple vehicle would be fashioned to make space as accessible by launch as overseas countries are now by airlift. The vehicle would be designed as part of a total system, with the intent of making space a truly accessible domain for large numbers of businesses and people.

SSoar is such a launch vehicle. The acronym SSoar stands for Single Stage to orbit and return. In the sense of bringing packages to space, it is a space vehicle. But it will also return to earth. Offering round trip service, SSoar will be a reusable means of delivering packages to space, and returning them

as needed.

By returning to earth, the vehicle will offer economies impossible to match with the expendable vehicles of an earlier era.

The vehicle will rely on existing hardware, where possible. The design of SSoar will be conservative in that there will be no attempt to push component capabilities to their maximum, yet advanced in that up-to-date technologies will be used.

In all the world's launches to date, orbit has been achieved by staging—a method whereby parts of the vehicle are thrown away at distinct parts of the ascent phase, to lighten the total package which finally gets to orbit. This has been necessary because the propellants and engines used couldn't generate enough power to propel their own mass plus the mass of the entire vehicle into orbital velocity.

But technology has advanced since the early days of rocketry, and now there are propellants and engines which can overcome this original problem. The problem with staging has been that it's very uneconomical to throw away highly sophisticated machinery, just to get the necessary velocity.

SSoar builds on work done in the

early and mid-1960's by Phil Bono, Krafft Ehrlicke, and Maxwell Hunter. Studies at that time showed conclusively that single stage to orbit vehicles could be built—and probably at a fraction of the cost of the larger winged vehicles then under consideration. In a paper written for the Second Space Technology Conference, Phil Bono wrote, "...the lifting-ballistic vertical-takeoff vertical-landing (VTOVL) reusable booster with low maneuverability...may be extremely cost-competitive in the small-payload class, a domain which previous studies reserved exclusively for the winged or lifting-body type of vehicle...The structural inefficiency of pressurized propellant tanks configured as wings or lifting-body shapes (which serve no purpose during vertical ascent) results in added liftoff and manufactured weights of a more expensive construction than standard propellant tanks of a conventional booster, even when that booster is configured as a performance-sensitive, single-stage launch vehicle."* In 1970, Dietrich Koelle of Messerschmitt-Boelkow-Blohm (MBB) wrote in a paper for the XXIst International Astronautical Congress: "It is shown that the single-stage ballistic concept from the stand-

point of development cost and operational simplicity is superior to other solutions, and, therefore, of special importance for a European way to space transportation economics."**

These economies were enhanced when subsequent studies by Rudi Beichel of Aerojet Liquid Rocket Company, and Bob Salkeld—an aerospace consultant—showed that not only were single stage to orbit vehicles both feasible and economically sound, but that there were ways of improving on these economies. The methods they defined involved what is known as "mixed-mode propulsion."

The mixed-mode concept involves combustion of a high density propellant early in flight, to bring about more rapid thrust-to-weight increase than is possible with hydrogen; and then switching to a propellant of high specific impulse (such as hydrogen) during ascent. According to Salkeld and Beichel, in a paper entitled "Reusable One-Stage-to-Orbit Shuttles: Brightening Prospects," the mixed-mode approach can reduce gravity losses during ascent by up to 500 feet per second.

Whether or not the vehicle burns in a mixed-mode, the recent technological advances of very lightweight structures for load carrying functions; light thermal shields for re-entry; and improved rocket engines which use high chamber pressure to give increased performance and reduced size and weight—all combine to make the single stage to orbit vehicle a technically sound concept.

As a particular design, the SSoar vehicle will launch in the vertical position, and will land vertically on legs in a manner similar to the Lunar Module of the Apollo program. The basic mode of propulsion will likely be a high pressure engine using hydrogen slush and liquid oxygen propellants—with a possible addition of high density hydrocarbons (mixed-mode) early in the ascent phase of flight.

The vehicle will have a clean, simple aerodynamic form, and will rely on standard shapes in processing to reduce cost. The inner tanks will be of hexagonal/cylindrical configuration, to allow both economies of fabrication and assembly, and flexibility of internal arrangement.

The main propulsion system will be a plug nozzle, with 15 to 24 combustion chambers concentric with the basic plug. The base of the plug will be used for re-entry.

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Many studies have shown the technical feasibility and economic desirability of a single stage to orbit vehicle. SSoar will take the concepts which have been formulated by experts in the aerospace industry and, building on those concepts, fly as an operational vehicle.

Wings or Not?

If space is to become an economically accessible domain, technical expertise must be mixed with common sense. At a cost of \$10 million to \$200 million per launch vehicle, common sense suggests that one does not discard the vehicle after a single flight.

Once one accepts the premise that the launch vehicle should be able to return to Earth for some large number of flights, then the next question is how to attain the goal. If it were a straightforward task, after all, we would have seen vehicles coming back from the very first days of spaceflight.

It is not a straightforward task, but it is not all that difficult either. Two approaches can be followed with today's state of technology. The vehicle can be brought back so it lands horizontally, like an aircraft (VTOHL); or it can land vertically, like a spacecraft (VTOVL). Either way is possible, and each has advantages and disadvantages.

The shape of the horizontal landing craft can take many forms, ranging from the "wooden shoe" type of lifting body, to the more familiar winged form of aircraft. While each has its own re-entry and aerodynamic handling characteristics, the two forms share one purpose: to re-enter from orbit with a large surface area providing deceleration and maneuverability; and to land horizontally on a runway.

The Shuttle is a winged form. Like virtually all the world's launch vehicles to date, the Shuttle uses the standard bell nozzle engine for thrust. Bell nozzles are complex pieces of equipment that convert the heat and pressure of combustion in a combustion chamber to unidirectional exhaust gas flow, to provide velocity energy.

The exhaust flow is constrained by and shaped by the interior wall of the nozzle during the exhaust process. Since propulsion characteristics are affected by external (atmospheric) pressure, the typical bell nozzle, by being designed for a specific pressure, is optimized in design for an average altitude. This, of course, implies sub-optimal performance at points other

than the optimized altitude.

There seem to be four main advantages to the winged/bell nozzle approach: Wings exist to give the vehicle a high lift-to-drag (L/D) ratio, which in turn

- limits deceleration forces during entry;
- allows maneuverability and range extension during atmospheric flight;
- allows conventional horizontal touchdown at landing, similar to aircraft.

In addition, the existence of wings gives the appearance of familiarity to the observer.

The first advantage is particularly useful in manned craft in limiting the forces on the crew during re-entry. However, the proper shaping of the re-entry trajectory can also help limit re-entry forces even without wings. The second advantage is particularly useful when the launch/landing site is significantly removed from the equator and when a number of contingency landing patterns are anticipated. However, a vehicle which lands on the equator from equatorial orbit needs little if any cross-range capability. Orbital dynamics has the vehicle passing over the landing site every orbit. In addition, this crossrange capability takes effect only after the vehicle has re-entered the atmosphere; but at the cost of some propellant, crossrange can be effected by proper positioning of the craft during de-orbit burn, before re-entry... again without wings. Finally, the amount of maneuverability is a matter of extent. A non-winged vehicle with any lift at all has some capacity for maneuverability and range extension. It's just that a winged vehicle has more.

The third advantage is moot, in that landing horizontally is a convention more than an absolute necessity for spacecraft. And the fourth advantage—familiarity—is an advantage mainly to those who resist change. While the appearance may be familiar, there is a crucial difference between using wings to fly through the air (aircraft), and using wings to re-enter from orbit (spacecraft). No vehicle has re-entered from Space with wings.

The winged form also has a number of disadvantages:

- A chemically powered winged vehicle is difficult to size in single-stage configuration for small payloads.
- Much of the vehicle's dry weight

is taken up by the inert weight of the wings—which means less payload.

- Adding wings to a vehicular shape adds inherent development and production cost.
- Landing requires a precise approach to a long runway.

There is some value, then, in exploring an alternative: vertical landing vehicles which use plug nozzles.

Vertical Take-Off and Vertical Landing (VTOVL) vehicles are shaped somewhat differently from the slender cylindrical body of the typical expendable booster. For stability reasons (and others), the VTOVL tends to be short and squat—an almost conical configuration. And all the VTOVL systems designed to date have the characteristic of re-entering in a lifting-ballistic mode ($L/D = 0.5$). While some designs would have the vehicle re-enter nose first, most re-enter plug first or aft end down. SSoar comes in aft end down. This plug approach will be considered in comparison to the winged approach.

Typically, the VTOVL uses a truncated aerospike or plug nozzle engine. The plug nozzle has been under development and test for many years, and some small rockets are now using plug nozzles. Where the bell nozzle uses the inside of a wall for exhaust shaping, the plug nozzle uses its outside surface for shaping. Thus with the flow of exhaust being determined by the surface of the plug and ambient atmosphere, the exhaust expands intrinsically as a function of atmospheric pressure. This means optimized performance at all altitudes of the flight regime.

Further, it takes a significantly larger bell nozzle to produce the thrust of an equivalent rated plug nozzle. This means use of a plug nozzle, by engine characteristics alone, can lead to shorter, more compact, and lighter vehicles. (Translate: less expensive). The use of a plug nozzle is crucial to the success of the VTOVL.

The beauty of the plug is not only that it promises superior launch performance characteristics, but also that its blunt end can be used for re-entry. The base of the plug acts as its heat shield, as with the Mercury, Gemini, and Apollo capsules.

By allowing re-entry without wings, the plug nozzle configuration has a number of inherent advantages.

- Re-entry techniques have been proved in many Mercury, Gemini, and Apollo flights.

- Design simplicity leads to operational simplicity.
- A plug nozzle configured vehicle can reach orbit (using H_2 and O_2) with a single stage.
- The whole system costs significantly less than winged configuration designed for similar payload.
- Re-entry forces are from front to back on crew members (the desired direction), and can be held to a reasonable low level (3G).
- A plug vehicle can land on water or land.

There seem to be two main disadvantages to the plug nozzle VTOVL.

1. Lateral cross-range capacity is restricted by inherent L/D ratios to less than 500 miles. But the problem of maneuverability and range extension can be overcome by launching into equatorial orbit and landing at equatorial sites. Even then, the plug vehicle is completely capable of launching and landing at higher latitudes.

2. The design needs some development in actual flight, and in landing under 1G (Earth) conditions. Large plug engines have been successfully fired for hours on test stands. Smaller plug engines have been flown—but none has yet gone to orbit. However, this appears to be a straightforward extrapolation from what's been done to date. As for landing, the technique was perfected in the Apollo program for landing on the moon. Landing on the earth in a similar manner should pose no great engineering difficulty.

Unless a large change is needed in flight path in re-entry, the choice in launch vehicle design seems to hinge on whether the prime determinant should be the psychological familiarity of wings or the economic advantages of the plug.

Hexcyl—A New Concept In Vehicle Structures

An economical launch vehicle should strive to carry the maximum volume and weight of cargo in the lightest possible structure. In satisfying this need, SSoar combines the shape of the hexagon with the cylinder. The "hexcyl" shape, compared with a standard cylindrical shape, has the same interior volume for an equivalent skin weight on a cylinder, but gives extra strength over the surface area covered. The design concept offers a great deal of flexibility in application, as indicated in the

following examples.

... Baffles can be attached to the flat panels of the hexagon, without penetration of the walls of the pressure vessel.

... The flat walls can be perforated, in which case the outside cells feed into the central hexagon and the perforated wall serves as a baffle. If they remain closed, the outer cells can contain other propellants, or even payload.

... The arrangement can be internally stacked in a very flexible manner, with dividing bulkheads placed in the outer cells as necessary to gain particular volume arrangements.

... Flat walls may be used for attaching lab equipment, tools, etc., when the interior is to serve as a manned workshop in a long duration mission.

... The smaller cylinders of the hexcyl (compared with the larger cylinder of equivalent volume) are more manageable for forming and handling.

... The area between the cells and the other wall may be used for landing legs, plumbing and wiring, electronics, attitude control components, and other components of the vehicle system.

The Launch Site

Before the site location is chosen, cost comparisons will have to be made. For example, a cost/benefit analysis must consider the cost to the user of shipping his payload to a foreign launch site versus the added cost of less efficient launching. However, initial analysis appears to favor countries on or very near the equator.

Advantages of equatorial launch and orbit:

1. Uses earth rotation to best advantage to maximize payload per launch.

2. Equatorial orbital dynamics are simplest. Orbital ground trace is on the equator and doesn't change from revolution to revolution.

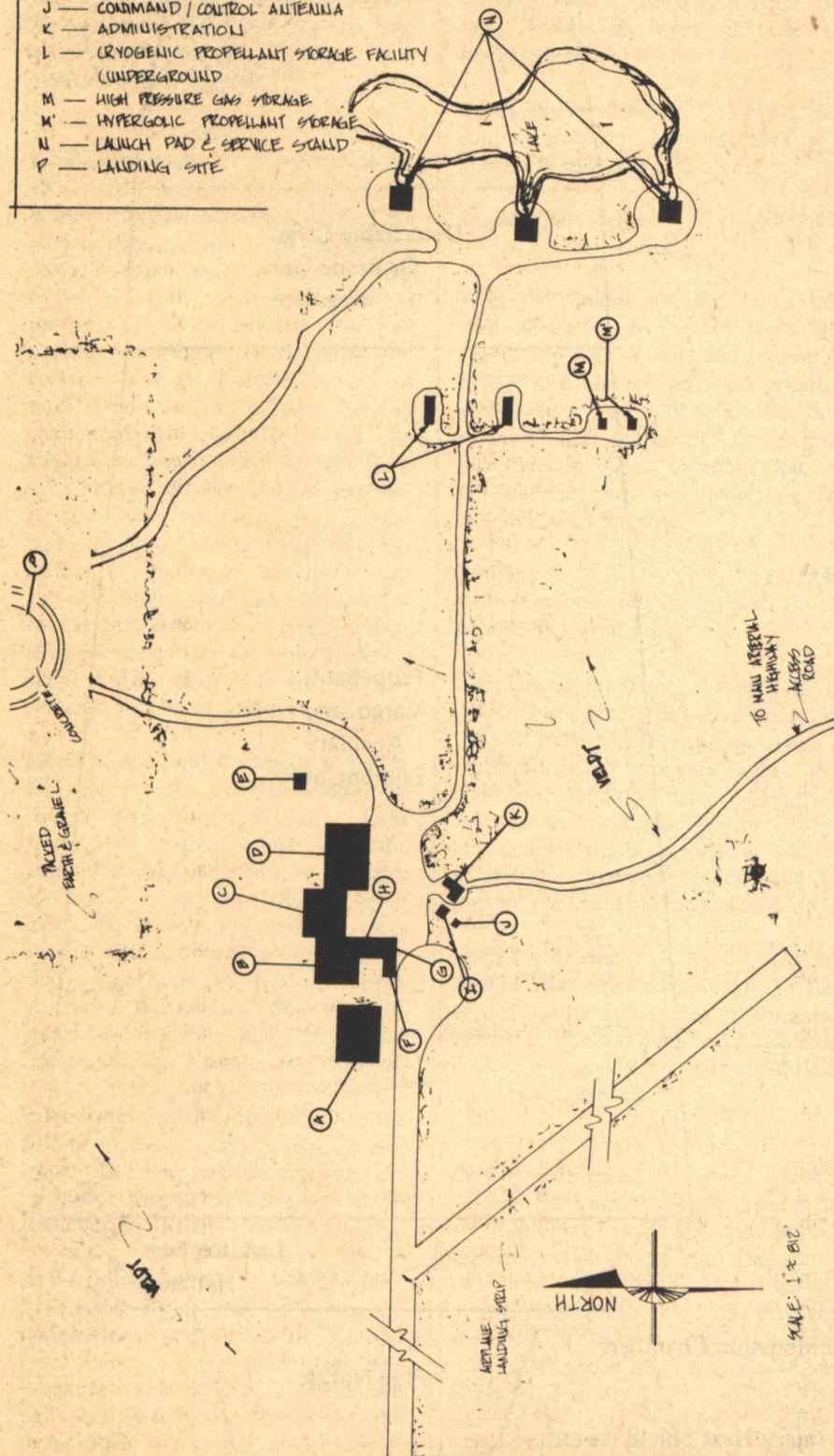
3. Location and tracking are simplified.

4. Launch window for minimum energy/fuel rendezvous occurs once every orbit. This simplifies operations, and allows more frequent and more flexible launch scheduling; reduces the time and cost penalty for missing a launch window; and greatly simplifies rescue operations.

5. Landing operations are simplified. The space vehicle overflies the launch/landing site every orbit. An

- A — AIRPLANE HANGER
- B — MACHINE/ELECTRICAL/ELECTRONIC SHOPS
- C — COMPONENTS ASSEMBLY AND TEST BUILDINGS
(POWER, GUIDANCE, ATTITUDE CONTROL, & ENGINE)
- D — PAYLOAD INSTALLATION FACILITY - SSOAR
MAINTENANCE/INSPECTION/REFURBISH FACILITY
- E — ORDNANCE STORAGE BUILDING
- F — CAR POOL
- G — PAYLOAD PROCESSING
- H — NON-DESTRUCTIVE TEST FACILITY (SSOAR & PAYLOAD)
- I — COUNTDOWN AND DATA FLOW FACILITY
- J — COMMAND/CONTROL ANTENNA
- K — ADMINISTRATION
- L — CRYOGENIC PROPELLANT STORAGE FACILITY
(UNDERGROUND)
- M — HIGH PRESSURE GAS STORAGE
- M' — HYPERGOLIC PROPELLANT STORAGE
- N — LAUNCH PAD & SERVICE STAND
- P — LANDING SITE

SITE PLAN



inflight decision to increase or decrease the number of orbits therefore poses no special maneuvering problems.

6. Vehicles do not need large cross-range capability. This greatly reduces cost since wings are not required.

7. An equatorial launch site is accessible to any orbital inclination—geo-stationary orbits in particular—with no dog-leg maneuvers necessary. This is valuable not only for placement of satellites, but also for maintenance and retrieval.

8. An equatorial orbit doesn't overfly the major world powers—hence military and political barriers are reduced.

9. There is a region over the South Atlantic, centered off the South American coast at about 30°S., called the South Atlantic Anomaly. This region has energetic trapped protons at low altitudes, which means potentially high radiation levels to satellites passing through. Equatorial flights avoid this anomaly, hence avoid a potentially harmful source of radiation.

Disadvantages of equatorial launch and orbit:

1. Extra cost of ground transport to and from the launch site.

2. Equatorial temperatures may place a high heat load on cryogenically fueled vehicles.

3. Possibility of building a new launch site. This would mean not only new launch and tracking capability, but also new feeder industries such as the manufacture of launcher fuels and oxidizers.

Scenario of Launch and Re-Entry

Day 1

Landing (00:00)

SSoar *Andromeda* hovers over the landing ellipse on throttled thrust. Once within the 500 foot circle of touchdown and 20 feet from the ground, the engines cut out and the vehicle descends to a soft landing. The three legs take up the weight of the 20,000 pound vehicle with ease.

Deactivating the Vehicle (00:10-00:30)

The ground crew drives its recovery vehicle up to *Andromeda* and begins deactivating the systems. While one person verifies that all systems are deactivated properly, a second verifies the safety of primary systems: landing legs are not buckled; propellant tanks are venting properly; engine cooldown is proceeding normally; et cetera.

Preparing to Tow (00:30-01:00)

A special platform is wheeled under SSoar. The pneumatic tread is inflated to bring the platform contour against the base of the plug. In the platform is cooling equipment, to relieve the lower body of the effects of heat soak-back. During re-entry and landing, much of the heat from the re-entry shock was carried away by radiation and the passing air stream. With the vehicle safely on the ground, however, the lack of air flow—coupled with heat from the landing maneuver—have combined to place a heat load on the base of the vehicle. This is alleviated by the platform's cooling equipment.

Towing (01:00-02:00)

The ground crew positions stabilizing arms against *Andromeda*, retracts *andromeda's* legs, and tows it back to the maintenance and refurbishing hangar. Towing is a long process: the distance from the landing site to the hangar is about two miles. The concrete taxi strip is smooth, but the vehicle is out of its natural element: the crew takes the greatest of care to avoid mishaps on this final leg of *Andromeda's* journey.

Safing the Vehicle (02:00-05:00)

Once in the hangar, automatic checkout equipment is plugged into modules on *Andromeda*, to transfer all power to launch facility outlets. Propellants remaining in the main tanks are vented and purged. A safety inspector performs a thorough safety check on the vehicle—using hands-on techniques and an automated checkout system.

Removing Payloads (05:00-10:00)

The maintenance crew opens the payload compartment and removes the payloads from their bays. These payloads are taken to another building for transfer to their owners. This flight carried three user payloads: a pilot production plant for silicon ribbon; a small biology experiment by a group of space enthusiasts; and several devices for growing crystals.

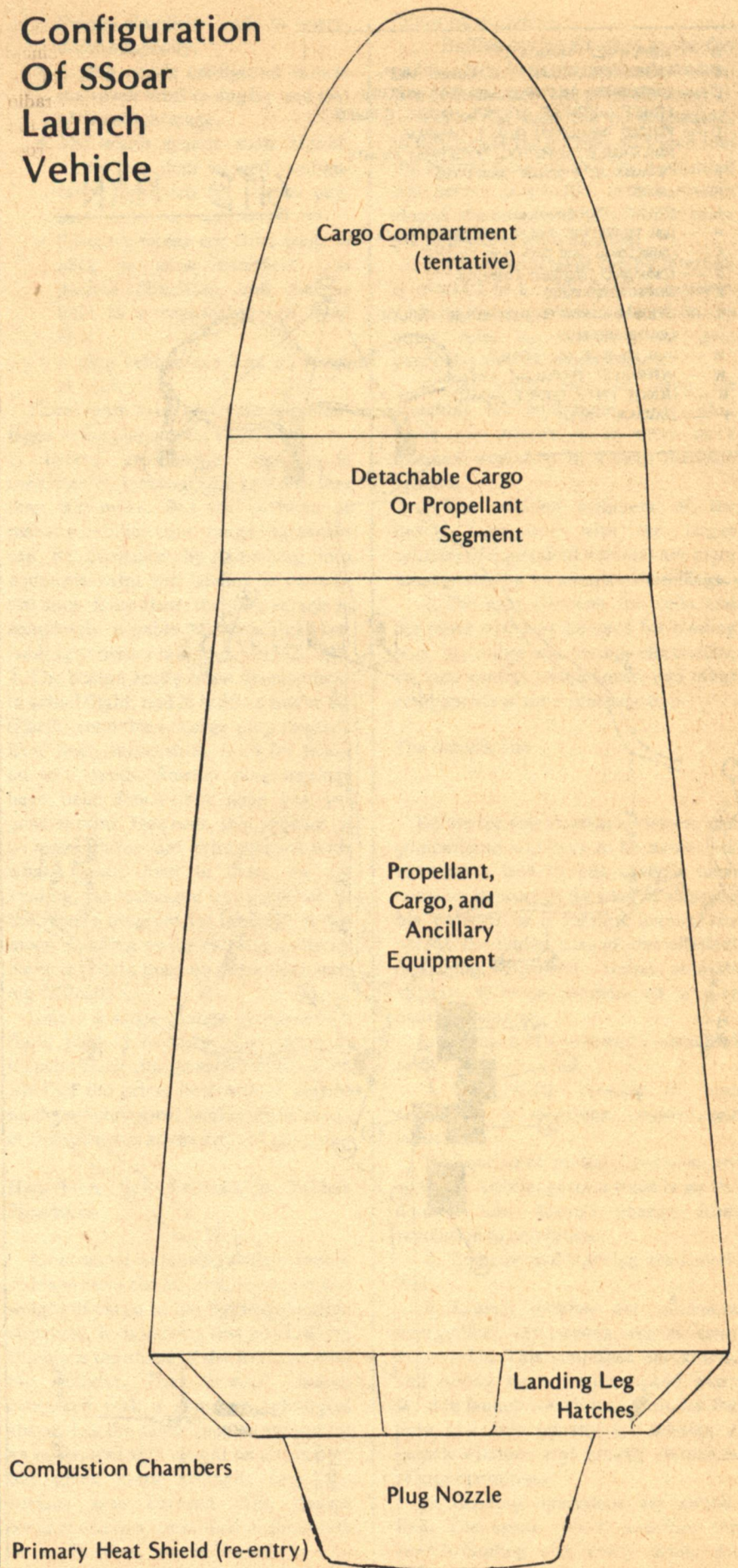
(10:00-24:00)

Day 2

Scheduled Maintenance (00:00-10:00)

No mission-unique kits were installed on this flight, so the maintenance crew begins scheduled maintenance tasks. They remove and replace the re-entry heat shield and honeycomb landing pads; check the combustion chambers for burn spots and replace a worn

Configuration Of SSoar Launch Vehicle



chamber; and test the turbopumps for smooth operation. The vehicle was initially designed for simple removal and replacement of parts, so component wear is treated as an ordinary maintenance task. Except for major overhauls, the vehicle is ready for flight within three days of landing.

Unscheduled Maintenance (10:00-24:00)

There are few unscheduled maintenance tasks on this flight. One landing leg actuator needs to be replaced. This period is mostly inactive.

Day 3

Loading Payloads (00:00-04:00)

The second cycle of ground activities begins. The payload crew has filled the payload compartment in the preparation room. They now move the compartment to *Andromeda* and bolt it down in the payload bay. The interface between payload and vehicle is very simple and consists of a few mechanical connections. There are two primary payload configurations: Payload for Return, and Payload for Space. The main difference is in the type of bolt: payloads intended for space orbit and release are attached with projecting bolts. Payloads for return to earth are attached with standard bolts. Since the payload bay door is designed to open in space, payloads for return have the option of being exposed to the space environment, or of remaining enclosed inside.

Final Checkout and Towing (04:00-08:00)

All access doors on the vehicle are closed. The operations crew gives *Andromeda* a final check with the payload in place to make sure all major systems are operations. Before being placed in the bay, the payload power system was activated. Now the crew checks the vehicle's internal power systems. *Andromeda* transmits its status to nearby data processing equipment via telemetry. With all systems looking good, the tow vehicle moves into position and trundles the towing platform under SSoar *Andromeda*. As before, stabilizing arms are positioned around the vehicle to stabilize it during its short journey on earth.

At the Launch Pad (08:00-09:00)

The launch pad is 3000 feet from the maintenance and refurbish hangar. Since there are three launch pads, one is always ready for launch. The launch pad is a simple site, devoid of the complex gantries seen in earlier eras. It

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serves mainly as a point of launch and a fueling site. Systems on the vehicle continually transmit their status to Launch Control via the on-board radio system. This not only verifies that the ship's components are working properly, but also that the radio system is working.

Fueling (09:00-10:00)

Hydrogen slush and liquid oxygen flow into *Andromeda* from the nearby underground tanks.

Readiness Verification (10:00-11:00)

Andromeda's final ground check is a Launch Readiness Verification.

Launch Countdown (11:00-12:00)

...Launch...

First Five Minutes of Flight (12:00-12:05)

Andromeda is at 300,000 feet. Its acceleration is 3G, and its velocity is 20,000 feet per second. Five minutes after launch, the vehicle is well into vacuum flight conditions. The engine has reduced thrust to about 380,000 pounds, but has simultaneously increased burn efficiency.

In Orbit (12:08)

With orbit insertion, *Andromeda* is in a 65 mile by 150 mile orbit.

Circularizing the Orbit (12:50-12:51)

A short burn circularizes the orbit at 150 nautical miles. *Andromeda* maintains a stable attitude to give this payload the weightless condition it needs. Primary attitude on this flight is with *Andromeda*'s main engines pointed at the sun to minimize hydrogen boiloff, and to prevent the liquid oxygen from freezing.

Orbit Verification (13:30)

Andromeda comes within range of the launch center's Far Reach trackers. Telemetry from *Andromeda* indicates it's in a very good orbit, only a half mile higher than planned.

Day 5

Preparing Re-entry (12:20)

Andromeda's main payload—a batch of super-strength magnetic materials—has completed processing. The materials have been liquified, processed, and solidified for re-entry. The needs of the other payloads on board—souvenir medallions and a small trans-lunar ion engine—have also been satisfied. The payload bay is now ready for re-entry, and *Andromeda*'s times, set for re-entry

sequencing, counts down for the various on-board activities. In one and a half orbits, *Andromeda* will be back on earth.

Verifying On-Board Calculations (13:05)

Andromeda transmits its calculations for de-orbit burn and re-entry to ground for final verification. Without correction, this flight will perform its tasks according to its own calculations.

Thrusting for De-Orbit (13:50)

Half-way around the world from Landing Site 1, *Andromeda* positions itself for de-orbit, and burns 15 seconds at reduced throttle to lower its velocity and bring it back home.

Re-Entry (14:15)

Andromeda is down to 400,000 feet. The first thermal shock begins to heat up the base of the vehicle, and the vehicle—plug nozzle down—begins to slow even more from aerodynamic forces.

(14:20)

At 250,000 feet, *Andromeda* begins to lose velocity at a rapid rate.

(14:24)

Altitude: 185,000 feet. Velocity: 16,000 feet per second. *Andromeda* is now in line of sight with landing zone.

(14:32)

Andromeda is now at 50,000 feet. Maximum G force during re-entry was 3G. At 50,000 feet, *Andromeda* is descending vertically (or nearly so) at 575 feet per second, or about 400 miles per hour. This velocity will be cut by a main engine burn and aerodynamic drag techniques.

Landing (14:36)

Andromeda is right on target and lands. The three legs take up the weight of the 20,000 pound vehicle with ease.

All during the mission sequence, payloads and their owners leave and arrive at the nearby airfield. Payloads large and small arrive at a frequency of about three per day. Most weigh less than 1000 pounds, while some weigh up to 5000 pounds. Many consist of raw materials, intended for emplacement in automated processing equipment which is kept at the launch site between flights. These raw materials are contracted for receipt on a continual basis at Launch Site 1, under arrangement

[Continued on page 17]



Gordon Eklund

ONCE BY ANGELS SEEN

Logan hadn't met the man yet, but he loathed him anyway.

That was one reason why he had to get out now. He wanted to soar through those black waters out there where the petty ways of humankind were seldom able to intrude.

BOUND IN THE WOMB of the submarine cockpit, Thomas Logan glared impatiently at the lean boyish figure that filled the center viewscreen of the control panel. "Lieutenant," he said, as softly and politely as he could manage, "I'm still waiting to be let out of the tube."

"Yes, sir, I know." The lieutenant was nervously scanning something just out of camera range. "I'm afraid your clearance hasn't come through yet."

"And it won't," Logan said sharply. "This is a private jaunt."

The lieutenant's anxiety visibly increased. "But, sir, Commander Everett issued strict orders that no unauthorized personnel should be allowed outside the tubes during the presence here of Mr. Isaac."

Logan sighed audibly. "Then maybe you'd better call him."

The lieutenant looked surprised. "Commander Everett?"

"Hell, no. He's not the problem. Isaac's the problem. Call him."

"But, sir, I can't very well—"

"Then let me out of here. Either call him or else open the tube. I'm tired of waiting around." He assumed the lieutenant wouldn't call his bluff. Jonathon Isaac was a high-level official with the Ministry of Oceans and Seas. He had only recently arrived in Atlantic Station Three from the surface two miles above for the unexpressed purpose of closing down the station. Logan hadn't met the man yet, but he loathed him anyway. That was one reason why he needed to get out now. He wanted to soar through those black waters out there where the petty ways of humankind were seldom allowed to intrude.

The lieutenant was working his mouth, attempting to speak. "Sir, I'll have to ask you to assume full responsibility in the event any—"

Logan cut him short. "I've been assuming full responsibility for myself since thirty years before you were born. Now cut the silliness and open the tube."

Logan switched off the viewscreen and chuckled softly to himself. It pleased him deeply to discover that his name and reputation were still capable of awing an occasional young man.

From the passengers' rest directly above where Logan lay, Janie Everett also chuckled. "Sometimes, Tom, I think you're a bit too mean."

"I'm not mean, Janie—just unpleasant."

"And you forgot to tell the lieutenant you were carrying a passenger."

"I didn't forget to tell—he forgot to ask. Now you'd better be quiet and switch on your screens if you want to watch us go."

Logan reached forward and activated his own set. The cockpit control panel of a two-man minisub came equipped with five separate television screens. The largest, centrally located upon the panel, was used for person-to-person receptions, while the four smaller screens placed in a square around it showed differing views of the surrounding terrain. The ultraviolet cameras mounted on the hull were seldom able to peer farther than a few hundred yards, so that in the open ocean a pilot was usually more dependent upon sonar than television. Tom Logan had been operating various subs in this section of the North Atlantic for more than twenty years. The sub was driven by a throttle set in

Logan understood that no serious scientist would ever sit still for such a conception. A Buddhist priest or a hindu philosopher, but not a certified biologist. Tomatoes and squids.

the floor where his right foot could easily touch it. To raise or lower the craft, he used a lever set near his chin. For a left turn, he rolled his body that way, and for a right turn, he rolled the other way. The prone pilot position was used in the smaller subs instead of the more conventional upright position, because for the pilot the sub seemed almost like a second layer of skin, one directly responsive to the impulses of his own body.

The top left-hand screen showed the tube. As Logan watched, the forward gate slowly rose and the dark waters tumbled inside. When the tube was full, the sub would automatically be thrust outward into the ocean. He waited patiently now. There was no need to speak to anyone. The forward push finally came with a slight jar, like a tiny quake. Logan glanced at the screens and, with satisfaction, now saw darkness reflected on all four.

Once in the open ocean, he drove easily, without the need for conscious deliberation. The fourth screen soon revealed the transparent bubble of Atlantic Station Three and the high pyramid that housed the station's personnel resting underneath. Logan could hear Janie above him gasping at the multitude of sea life the screens now displayed. She had been away from this world for five years, and he believed he could understand the wonder she felt. The view down here was simply too magnificent to be easily recalled. It had to be experienced anew each time. Even Logan, after all these years, felt some of the awe that Janie was feeling now.

The lights of the station tended to attract a great many sea creatures, so that after a hundred yards or so the ocean noticeably cleared. Logan dropped his chin and felt the sub

drift upward in automatic response. He eased the throttle forward and then glanced at his watch. The lieutenant had delayed them but sufficient time still remained to rendezvous with Lancelot. The minisub swiftly glided through the ocean two miles beneath the Atlantic surface. There was little sense of motion and none at all of the extreme pressure. Thomas Logan was an embryo floating in the pre-natal womb. The metaphor was not inexact. Hadn't all life once originated here? Logan wondered. He saw humankind as an old and stagnant race come home to the place of its birth better to prepare for final extinction. He frowned at the bitter tone of his own thoughts. The end wasn't here quite yet. Or was it?

"Tom," Janie said, from above, "are you going to want to use the outside lights?"

"No, not yet," he said, welcoming the interruption. "We might run into a party from the station. I don't want to have to answer any questions."

"But you do think we'll find him, don't you? Lancelot, I mean."

"If he's home today, we will," Logan said.



THE HULL OF THE MINISUB burned like a bright Christmas tree, as Thomas Logan carefully balanced the craft some four hundred feet off the ocean floor near the sheer perpendicular cliff of Alister Rock. An uncommonly strong current ran through this area and even the sea bottom, normally covered a hundred feet deep in mud and muck, showed a smooth rocky face. Logan kept the sub a safe distance from the cliff. Over the years, the current tended to erode the rock, and he had noticed an unstable portion that seemed likely to topple toward the sea bottom at any moment. Alister Rock happened to form part of Lancelot's usual hunting grounds. Logan had discovered more than five years ago that the great squid passed this way once every eight days as regularly as a clock.

Logan called Janie's attention to the sonar screen. "Actually, Lancelot usually glides right up that section of cliff to the north, but I don't think it's safe to go any closer than we are."

She didn't dispute his decision. "How late are we?"

Logan looked at his watch again. "We're early. Lancelot's still got another few minutes. He'll be sure to see our outside lights."

"And he's really as big as you say?"

"Bigger, if anything. The sonar says he measures one hundred fifty-eight feet from his flukes to the tips of his two big feelers."

"That's forty feet longer than the biggest blue whale."

"Well, only about a quarter of Lancelot is actually body. He is growing, though, I'm pretty sure."

"Growing?" Her voice betrayed its first hint of disbelief.

"Sure. Why not?" The ocean, unlike the land, offered no absolute limits to the size of an animal. Lancelot was more than a hundred fifty feet long, but Logan did not doubt that other squids existed that were even longer still. Two hundred feet, even three. It wasn't impossible, and what wasn't impossible was very often true.

While he waited for the squid, Logan studied the television screens. The outside lights had already drawn a crowd of sea life. In the darkness down here, many creatures came equipped with their own forms of luminosity. Such lights

ONCE BY ANGELS SEEN

not only aided visibility but were often used for feeding, hunting, and even mating purposes. Logan often wondered what these creatures thought of the sub. A bright whale? A flaming shark? No two fish seen upon the four screens seemed identical. Some bore tendrils twice the length of their bodies. Others had mouths wide enough to swallow a dozen of their own kind in a single gulp. A person might occupy an entire lifetime classifying these various breeds. In fact, in the station, several dozen marine biologists did just that.

Janie was obviously transfixed by the same view. "I wish we could bring him out here and show him this."

"Bring who out?" Logan said.

"Isaac, of course. He came down in the bell. I'll bet he hasn't even looked outside the pyramid since then."

Logan didn't like to be reminded of Isaac's visit. It meant, in a few months time, he would be deprived of all this. "It wouldn't mean anything to him."

"It would have to. This is life—this is what the world's all about. He's a human being, isn't he?"

"He's a bureaucrat. Show this to Isaac, and he'll say it has nothing to do with trying to feed ten billion hungry people up above. He'll tell you about the proper allocation of limited resources."

"But that's stupid. That's saying the only purpose of life is staying alive long enough to die."

"That is the only purpose, Janie. To most people."

"But not to me, Tom. Or you, either."

"No," he admitted, "not to me." He wished he could be as sure as she was that that was true. His eye caught a corner of the sonar screen. "Janie," he said softly, "here he comes. It's Lancelot, all right."

The squid moved swiftly down the steep face of Alister Rock. One hundred fifty feet in length. *Architeuthis princeps*. The giant squid. The kraken of the deeps. Lancelot. Logan recalled how, a year ago, he had watched as a sperm whale, prowling the deeps in search of prey, had happened to chance upon Lancelot. The ensuing battle had had an outcome quite different from what usually occurred. Lancelot's two long feelers, stretching to a length of a hundred feet, wrapped around the whale like a spider's unbreakable web. The whale thrashed and twisted, but Lancelot held firm. In mass, the squid was nowhere near the whale's equal, but in these deep waters, the whale had only bare moments in which to attack, kill, and flee. A quarter-hour passed before Lancelot released the dead and drowned whale. Logan had watched in silent awe as the seventy-foot carcass floated gingerly upward toward the distant surface miles above.

"I think he's coming toward us," Janie said excitedly.

"He is," Logan said. He had expected the outside lights to turn the trick. "But don't be afraid—he won't harm us."

"Oh, I'm not afraid, Tom. I'm just—impressed."

He smiled and, swiveling his head away from the sonar, studied the upper-left viewscreen. The ocean here ran relatively clearly and the cameras managed to penetrate up to two hundred yards in any direction. He spotted Lancelot. The two forward feelers swept into camera range and then came the eight smaller arms and finally, all at once, the face. Logan stared at Lancelot's wide mouth and great beak. He met the indirect gaze of those lidless eyes, each more than a foot in diameter.

"Why, he's beautiful," Janie said, her voice filled with wonder as well as surprise.

"Didn't I tell you?" said Logan. As Lancelot approached,

he put his body through a marvelous series of color changes, flashing from dark brown to yellow to bright red and finally to a dazzling shade of pure white. Logan had witnessed this performance many times before, and on each occasion he had asked himself: what can he possibly be doing? Saying hello to me?

Logan had first discovered Lancelot some five years ago, shortly after Janie's departure from the station to attend school topside. The scarcity of large fish in the vicinity of Alister Rock had long puzzled the marine biologists, but Lancelot was shy, and only vague flashes of his presence had appeared upon the sonar. The accepted theory was that three or four big squids hunted in the area, but Logan, intrigued by the problem and with time to spare, had come out personally to investigate. It had taken more than six months of regular visits before Lancelot had finally shown himself. Logan recalled the first time those giant tendrils wrapped themselves around the hull of the sub. But Lancelot had not harmed him. Not then—and not ever. He and Lancelot were friends. By now, after five years, they understood each other very well indeed.

Logan had never reported his discovery. Why? At first he hadn't entirely been sure—he had kept silent purely from instinct—but by now he believed that his reasoning was clear. Lancelot belonged to him in a very special way. He was like an art collector in private possession of a masterpiece by Vermeer or Manet. To expose the glory that was his alone to the prying eyes of other men would somehow reduce not only the value of the work but its intrinsic beauty as well. Lancelot had chosen to reveal himself to Logan in the first place because he had sensed that he could trust this man. Logan would have chosen death over casual betrayal. Silly? A bit of adolescent anthropomorphism? Logan thought not. A bond of real friendship held the two of them close. He and Lancelot were very much the same. Both were oddities. Lancelot because of what he was; Logan because of who he was.

But Janie was different. He had always intended to show Lancelot to her. Janie was also a friend to be trusted.

"Lancelot," Logan said aloud, "I've brought an old friend of mine to meet you. This is Janie. She understands who you are and what you are and you can trust her."

"I do, Lancelot," Janie said. "I really do."

The squid circled the sub gracefully. Occasionally, a thrashing tendril brushed the hull, rocking the sub, and Logan fought to keep the craft steady in the water. They were alone now. The sea creatures had long since vanished into surrounding darkness. Only the squid and the sub remained.

"What's he doing?" Janie asked.

"I have no idea."

"We don't . . . don't really know anything about them, do we?"

"No," Logan said. "Even now, after twenty years of deep water research, what we know about the giant squids could be scribbled on a single page of notebook paper. Lancelot visits this area every eight days on the nose. Coincidence? Maybe, but I find that hard to accept. But how else do you explain it? Lancelot has never seen the sun in his life. There's two miles of water between him and it. Why eight days? Why not seven days, twenty-three hours, fourteen minutes? Why visit here regularly at all?"

"I don't know," Janie said.

"And neither does anyone else. That's what makes Lancelot such a fascinating creature."

“To hell with the average man. Since when has the average man ever had a damn thing to do with the progress of the human race?”

“He acts almost intelligent.”

“I know.”

“Like he’s glad to see us and is putting on a show.”

“Maybe he is glad, Janie. It must be pretty lonely for Lancelot out here. If he has a squid friend of either sex, he’s kept that a secret from me all these years.”

She laughed softly. “I do wish Isaac could see this. I know Lancelot would make him change his mind about closing the station.”

“Do you really think that’s all it would take, Janie?” He couldn’t disguise the way he envied her youthful optimism.

“If it wouldn’t, then he’s hopeless.”

Logan peered at the vast, graceful, streamlined form of the swiftly swimming squid. “Maybe he is.”

“But Lancelot isn’t,” Janie said. “Lancelot is beautiful.”

WHEN THOMAS LOGAN reached his room on the fourth floor of the pyramid of Atlantic Station Three, he discovered a note pinned to his pillow.

He picked it up, read it, rubbed his chin, tried to smile, but finally frowned. The note, more than two hours old, directed Logan to report at once to the private quarters of Commander Ronald Everett. He knew he ought to be pleased by the summons. If he was to have any opportunity at all of putting his vaguely formed plans into effect, he would first actually have to meet with this Mr. Isaac, and he understood that what this note really meant was that Isaac wished to speak with him. Still, Logan hesitated. He had spent twenty years doing little or nothing, drifting with the slow metaphorical tides that existed down here, and by now even the thought of taking direct, personal action disturbed

and frightened him. What if he tried and then failed? Could he bear that? Wasn’t it better—safer—simply to stand aside and let Isaac close the station the way he wished? Involvement always necessitated a deeper wound. Young people like Janie could endure that sort of private pain. Logan realized he hadn’t been a kid for more than twenty years, and he was sorry.

Dropping down upon the bunk, he crumpled the note and let it fall to the floor. Ron Everett would be there, too, which made the situation even more difficult. The relationship between the two men, always a cautious one, had grown increasingly remote over the past five years. They nodded when they passed; they spoke only when it was necessary. Of course, Logan could always have tried to explain, but even that relatively simple action was one he had refused to take. Five years ago, Ron Everett had discovered the existence of an affair between his nineteen-year-old daughter and a forty-year-old man, and he had reacted the way fathers had for centuries and sent his daughter away to school topside. Logan could have explained that while he and Janie had indeed made love, their relationship was always closer to that of a teacher and pupil than anything else. There was love between them, yes, but never any passion. He hadn’t intended to use or hurt Janie, and he believed that he had succeeded. But would Everett have listened to that? Then—five years ago—or even now? Logan didn’t know. He did know that the whole matter really went back another fifteen years deeper into the past. He and Everett could never have discussed the affair with Janie and not also raised the ancient ghost of the first manned Martian expedition, and that subject was one Logan never discussed with anyone—not even with Janie herself. Her mother, Everett’s wife Lauren, had been among the four crewmen who had perished on that planet. Four dead, and only one who had survived. That one had happened to be Thomas Logan. Neither he nor Ron Everett could ever forget that.

He stood up suddenly. Moving deliberately, he stepped into the corridor and then walked swiftly. The pyramidal shape of the big building allowed it to fit more snugly beneath the high dome that shielded the station from the pressures of the surrounding ocean. Close to three hundred separate offices and rooms were spread over nine floors of the pyramid. The larger lower three floors were given over to the various marine research teams, while the next five contained personal living quarters. The commander’s home and offices occupied the tiny tip of the pyramid, the ninth and final floor.

But many of these three hundred rooms were presently unoccupied. As he stepped toward the elevator, Logan counted the people he passed. Six—only six. Even five years ago, that number would have stood at least three times higher. For that many years, the Ministry of Oceans and Seas had been attempting slowly to strangle Atlantic Station Three. Now Isaac had arrived to administer the final fatal tug on the rope.

They claimed it was simply a matter of priorities, but Logan believed the crucial factor was lack of imagination. He had long argued in favor of partial conversion, but few people bothered to listen. Atlantic Station Three was surrounded literally by tons of available protein; more than enough could be harvested to pay the station’s upkeep and do so quite handsomely. But the bureaucrats said no. Ac-

ording to them, the stations already in operation along the coastal shelves provided needed food more readily and cheaply than any possible deep-sea operation. If additional food was ever required—and Logan knew it soon would be—then more coastal stations could be built.

Logan disagreed with this analysis. He was convinced that it didn't make the least sort of sense. How could it possibly be less expensive to build new stations than to make use of one already functioning?

Still, Logan occasionally scanned a topside newstape and he wasn't entirely unfamiliar with the world that presently existed up there. But it was their own damned fault. He insisted upon making that distinction. The brushfire wars and savage riots, the plagues and famines, pollutant death and dwindling resources. The human race had bred too quickly and wasted too casually. The ocean was different. Here, men were intruders, not occupants. But the same was true of space and, twenty years ago, humanity had deserted that sphere. Logan wondered. Could he ever live in exile up there among those frantic masses? He had gone from Mars straight to the ocean depths. Where on earth would he go? How would he manage to live? Was there hope for him beyond the pale walls of an old folks' rest home? He smiled at the image of himself rocketing through sterile corridors at the controls of a speeding wheelchair. But it wasn't funny. That was where Isaac intended to put him. To survive, he would now have to fight back.



HE ELEVATOR carried Thomas Logan straight to the front door of Commander Ronald Everett's apartment. He left himself inside without knocking and immediately spied two heads rising above the back of a living room couch. One head, nearly bald, belonged to Ron Everett; the other, crowned by a crazy tatch of blond curls, had to be Jonathon Isaac.

Logan took a deep breath, then moved boldly forward. He felt like an overaged Hamlet entering the stage. To act or not to act? He believed he had made up his mind at last.

"You wanted to see me, Commander Everett?"

The two heads swiveled in neat unison. Isaac was young—damned young. "Mr. Isaac here did," Ron Everett said.

"I won't say I'm glad to meet you," Logan said, stepping forward to grip Isaac's extended hand. His own directness caught him almost by surprise. "I think you're totally wrong in what you've come here to set out to do."

Isaac shook his head and forced a painful smile. "Well, actually, I haven't come here to do anything. This is purely an inspection tour on my part."

"Of course." Logan smiled politely and sat in a chair across from the other two men. "And you wanted to see me. Well, do you mind if I ask why? As Commander Everett can tell you, I have no official capacity here at the station. I'm a washed-up former celebrity and this happens to be the place where I've chosen to hide away."

Isaac gave a crisp nod. "I understand that, Mr. Logan," he said drily, "but I had rather hoped to have your impressions of the station. As you must be aware, the Ministry is presently faced with a severe budgetary crisis. I'd like to have you put yourself in my place and hear you defend the continued operation of this station."

Logan shrugged casually. "I can do that easily enough. Adventure, beauty, and knowledge. Those are defenses enough for me."

Gordon Eklund

Isaac smiled sourly. "But such abstracts are hard to sell to hungry people."

"When have you ever tried?"

"Mr. Logan, I really don't think—"

Commander Everett rushed in to try to ease the tense mood. Logan doubted he had much chance to succeeding. "I think what Mr. Isaac is trying to say, Tom, is that we have to establish priorities. You've led as full a life as any man alive today. Those things you mentioned, beauty and so on, are important to you. But Mr. Isaac has to worry about the average man."

"To hell with the average man," Logan said. "Since when has the average man ever had a damn thing to do with the progress of the human race?"

"Tom, that's elitism," Everett said.

"So what if it is?"

"Look, Mr. Logan," Isaac said, "I think I can understand how you feel about this, but I wish you'd try to extend that same privilege to me. I'm not my own boss. I can't let emotional claims sway my practical judgment. If you can provide me with some firm, definite, sensible reasons for continuing the operations of this station, I'll be glad to listen. Otherwise, I'm afraid I'll have to—"

Logan knew this was exactly the opening for which he had been waiting. "I won't tell you a thing, Mr. Isaac. I'll show you instead."

Isaac seemed confused. "But I don't—"

"You're down here now, Mr. Isaac," Logan went on, "but have you even bothered to look around? As far as I'm concerned, everything you want to know is sitting right here in front of your face. Let me take you out. Let me show you the open sea. Let me show you what our world is like out there. Let me do that, and I'll promise you, no matter what you decide, you won't hear another word of argument from me."

"I'm afraid that's impossible, Tom," Everett said soothingly. "Mr. Isaac's time with us is quite limited. He can't be expected to—"

"Why can't he?" This was Janie, entering the room suddenly from the back. "What I don't understand is why Mr. Isaac even bothered to come here, since he's obviously already made up his mind to shut us down."

"Janie, that's rude," Everett said.

But Logan smiled at her, welcoming the assistance. Did Janie guess what he intended? Some of it, perhaps yes, but surely not all of it. And Logan was glad of that.

Isaac was shaking his head. "I came here simply to observe for myself your real circumstances. That's what I told Mr. Logan and that happens to be the truth."

"Then there's absolutely no reason why you and Tom can't go out for a quick minibus trip." Janie stood in front of Isaac and glowered angrily. "The real circumstances of this station can't be found up here on the ninth floor of the pyramid. What's really being done is being done out there—in the ocean."

"I originally intended to go out," Isaac said, "but your father warned me that it might be dangerous."

"What else should it be?" Janie said derisively. "Of course it's dangerous. So is walking down the street in Boston at night. I ought to know. I lived there for five years."

"Janie," Everett said softly, "there's really nothing to be proved by any of this."

He saw humankind as an old and stagnant race come home to the place of its birth, better to prepare for final extinction.

"I think there is," she said. "I think a lot can be proved just by opening Mr. Isaac's eyes and letting him see just what it is that keeps people working down here. I think he ought to be shown that the majority of all higher life happens to live in the sea, and that to try to ignore it is the same as trying to ignore the earth itself. Practical reasons? Of course there are practical reasons. Why are people topside starving to death? Because of ignorance. And you don't cure ignorance by adding to it."

Logan didn't believe he could have put it any better himself. Isaac was beaten, and he even seemed to know it.

"The bell is due to pick me up in six hours," he said.

"Tom will need only two."

Isaac looked at Janie, then at Logan, and finally threw up his hands. He smiled. "All right—you win. Mr. Logan, show me whatever it is you want to show me."

"It's just life that I'm going to show you, Mr. Isaac. Just that—nothing more." And yet, despite the victory Janie had just helped him win, Logan still didn't feel like a winner. It would have been so much easier the other way. Defeat was something he understood well. He stood up suddenly. "I'll meet you at the tubes in twenty minutes, Mr. Isaac. I have to get something from my room first."

Logan's abruptness puzzled Everett, who glanced curiously at him. "Is something the matter, Tom?"

He shook his head, distracted. "No, nothing at all." And he hurried quickly away.

In his room, Thomas Logan sat and tried to decide whether his own eccentric viewpoint carried sufficient validity to form the basis for concrete action.

In other words, how much should he actually show to

Isaac? He knew what Janie expected, he knew what his own original intentions had been, but did he now dare go ahead? Should he show Lancelot to Isaac and, if so, how much farther should he then proceed? Just showing Lancelot meant betraying a trust he had kept for five years. Were his reasons good enough now? This was what he had to decide in less than a quarter-hour, and yet his mind refused to cooperate. It seemed to run in an endlessly dwindling spiral. He could decide nothing.

Casually, Logan fingered the plate of hydroponically-grown tomatoes on the table in front of him. His own deeply held beliefs often disturbed him. What, for instance, was the real meaning of intelligence? Could he even say for certain that these tomatoes, in their undoubtedly peculiar fashion, were totally devoid of that quality? And, if not a plate of tomatoes, then what about Lancelot? His logic told him that intelligence meant reasoning ability and that humankind of all the myriad species had climbed high enough upon the evolutionary ladder to possess true reasoning power. But was that all? Didn't Lancelot exist in perfect rhythm and harmony with his chosen environment? Didn't he control and dominate that world? Once the ethnocentric abstractions of reason and rationality were removed, what remained to denote intelligence? Did Lancelot think and feel? How could he do otherwise?

Logan understood that no serious scientist would ever sit still for such a conception. A Buddhist priest or a Hindu philosopher, but not a certified biologist. Tomatoes and squids. Even creatures as close to human as the whales and dolphins were classified with the beasts of the fields and raised and slaughtered around the world in the hundreds and thousands.

But Logan wasn't so sure. He knew this obsession of his with life and intelligence might well be a purely private thing. Alone of all men alive today, Thomas Logan had walked and lived upon an otherwise lifeless planet. Four others had died there, while he alone survived. He knew why. The newstapes credited his intelligence. But that wasn't true.

And, when he returned alive to earth, the politicians and bureaucrats swooped down and closed the manned space program forever. Logan had then come here—to Atlantic Station Three—to live out his life in silence and peace. But his obsessions had not changed. If anything, they had grown. Life and intelligence: these concepts dominated his existence.

Was there a way out? Could he show Lancelot to Isaac and survive? Not physical death—he had failed to fear that since leaving Mars—but spiritual?

Nonsense? Senile ravings? Or what? Logan leaned close to the tabletop and watched the flickerings of light scurrying across the plateful of tomatoes. Was he ready yet to decide?

A knock sounded at the door. Standing, Logan went over and let Commander Ronald Everett inside.

The two men stood silently, frowning at one another.

"Tom, I want to talk to you," Everett said at last.

"Of course, Ron. Won't you sit down?"

They faced each other across the tabletop. Everett had last visited this room more than five years ago. Logan didn't think it had changed in the interim.

Everett seemed to be staring at the tomatoes. "Tom, I don't like this whole thing with taking Isaac on a jaunt. It's

pointless. You of all people ought to know that."

"Maybe I do, but Janie doesn't."

Everett seemed to wince at the mention of his daughter's name. "Janie is very young. She's been known to make mistakes in the past."

It was Logan's turn to wince. This, he knew, would be the perfect time to tell Everett everything, to explain the truth of his relationship with Janie, but he could never do that. To talk of Janie would force him to talk of Lauren Everett and Mars, and that was the part he never could bear. He said, "We're not talking about the past now."

"No, I suppose we aren't," Everett said slowly. "But you took Janie out on an unauthorized jaunt today. Would you mind telling me why?"

"Not at all." Logan sensed that the critical point in their conversation had passed. He relaxed inwardly. "I took her out because she asked me to. Janie is twenty-four years old. I couldn't say no."

"Where did you go?"

"Around Alister Rock. It's the same area where I intend to take Isaac."

"That's not a safe vicinity. The current is dangerous."

"I don't intend to climb the cliff."

Everett stared at him coldly. "Then what exactly are your intentions, Tom?"

Logan let his own mind decide. When the falsehood came to his tongue, he let it simmer carefully before finally speaking aloud. "I intend to take Mr. Isaac and show him the fish and bring him back here. Giant jaws and funny tendrils. I intend to give him something to tell his children about."

"And that's all?" Everett said.

Logan shrugged. "What else is there?"

"It won't change his mind."

"Or yours?"

Everett shook his head. "What I think doesn't matter."

"It does to Janie."

"Janie still believes in the difference between right and wrong. What she can't understand is that two conflicting ideas may both be right. In this case, they are."

"Is ignorance ever right?"

Everett looked away, as if in sudden shame. At last, he stood and trudged heavily toward the door. "Isaac is on his way to the tubes. I told him you'd meet him there."

Logan stood up. "I'm on my way."

He had decided.

Thomas Logan maneuvered the minisub some two hundred yards out from the sheer face of Alister Rock. As usual, the waters here ran remarkably clear, and Isaac, seated above, was afforded a perfect view of the huge variety of sea life that passed in front of the sub's four ultraviolet cameras. Logan glanced at the television screens only to identify certain species for the curious Isaac. Otherwise, he kept his attention fixed to the sonar screen. A full hour out already and so far not one sign of Lancelot. He had to admit he was worried.

What he had counted on was the likelihood that Lancelot would not have wandered far from here during the past few hours. He knew that the great squid often lingered in this vicinity for as much as a full day at a time. The hunting here was usually excellent, because of the strong current, and there were numerous caves and ridges where even a creature as large as Lancelot could easily conceal himself.

Which, thought Logan, was probably what Lancelot was

doing right now.

Isaac's voice reached him from above. "Shouldn't we be heading back to the station fairly soon, Mr. Logan?"

"A few more minutes and we will," Logan said casually.

"What's that odd glow I keep noticing on the screens? It's almost like a flashing light."

"It is." He welcomed the chance to discuss something other than their eventual return. "The lights are on the hull of the sub. It's an old trick of mine. The lights not only attract the fish, they also seem to help keep them calm. They think the sub is just another fish."

"A rather large one, I would think."

"No, not especially. In fact, I think I just caught a glimpse of a big squid on the sonar." That wasn't true, but Logan was growing desperate. "Maybe I ought to head closer to the cliff and see."

"I understand some specimens of giant squid grow to lengths approaching seventy feet," Isaac said.

"Some are even bigger."

"Then I do hope we find something. That's a sight I wouldn't want to miss." So far, Isaac had shown little hesitancy about expressing a real sense of wonder at some of the things he had seen. Logan was grateful for that. The Ministry might have sent a man for whom even Lancelot would have been a meaningless experience. Isaac's openness made Logan's gamble that much more worth risking. Of course, unless Lancelot soon appeared, absolutely nothing could be done.

"Maybe we shouldn't go too far," Isaac said tentatively. "Our air supply isn't unlimited, is it?"

"No, but I brought some extra tanks."

"Do you always do that?"

"When I'm carrying passengers, yes. I had a bad experience on Mars twenty years ago that you may have heard about. Since then, I'm always careful with my air."

"Oh, I'm sorry. I didn't mean to bring that up."

"No, it's all right," Logan said. "That was a long time ago."

He moved the sub closer to the cliff, then dropped his chin and let the craft descend. He kept an eye upon the sonar and drew up a hundred yards short of the ocean floor. If Lancelot was anywhere near, this was a good spot from which to confront him. More importantly, the weak critical point in the cliff face, the section of loose rock he had noticed earlier today, lay straight ahead.

He listened dimly to Isaac speaking from above. "I think I'm beginning to understand why you people want to stay down here. This is so much more impressive than I anticipated. On film, it's nothing compared to this. The four separate screens make an incredible difference."

"That's because the ocean is a truly three-dimensional world," Logan said. "On the surface, except for the birds, everything is limited to life in only two."

Logan kept the sub steady. He wasn't searching for Lancelot now; he was waiting. The hull lights flickered rhythmically: red and orange, white and gold. Here I am, he thought. Trust me, Lancelot—please. This is for the good of both of us.

But was it? He tried to be honest with himself. How could the banishment of humankind from the deep ocean possibly harm Lancelot? No, he finally admitted, we need Lancelot far more than he'll ever need us. I need him.

Then at last he spotted upon the sonar screen the familiar

To expose the glory that was his alone to the prying eyes of other men would somehow reduce not only the value of the work but its intrinsic value as well.

thrashing blot that had to be Lancelot. He waited until he was certain there was no mistake, then spoke calmly: "Mr. Isaac, take a look at your sonar screen. I think I've found that big squid I was telling you about."

Logan rested his foot against the throttle. On the screen, Lancelot was descending quickly now, drawing very close.

Then Lancelot burst fully into view. The clear ocean revealed him perfectly. Logan saw the ten madly waving arms, the two huge twisting feelers. He saw the squid's beak, lidless eyes, and massive flukes.

Isaac saw all of that, too. "Good God!" he cried. "That thing is huge!"

"Yes," Logan said softly, "he is."

Then his foot slammed down hard against the throttle. The sub thrust forward. Logan had long since gauged the exact spot upon the cliff where he had to ram. These little subs were designed specifically to withstand the immense pressures of the deep ocean. If everything went perfectly, Logan believed he had at least a fifty-fifty chance of surviving the initial impact and resultant avalanche. Of course, he had to be perfect. A few yards in any wrong direction, and he was apt to bring half-a-mountain crashing down upon the tiny sub. When the nose of the craft first struck the cliff, he heard Isaac cry out in surprise. Oddly, it was the first sound he had uttered since Logan's rush forward. The sub spun away from the cliff and fell wildly. The rock above, Logan knew, must be falling, too. How much? For a brief instant, he was able to watch the cascade of falling rock reflected upon the sonar screen. Then the sub struck the ocean floor and, a moment later, it was buried.

He heard Isaac screaming now. For himself, Logan thought about uttering a prayer.



THOMAS LOGAN AWOKE to absolute darkness.

In the close confines of the submarine cockpit, he heard the gentle pumping of the air tanks. Then he heard his own breath, the pounding of his heart.

Thomas Logan believed that so far he was alive.

"Isaac?" he said softly. "Isaac, are you there?"

"Yes," said a half-choked voice. "For God's sake, yes. Logan, what happened?"

He chose his words carefully to avoid panicking the other man. "We must have bumped the cliff and dislodged some loose rock. We're on the bottom."

"And buried?" said Isaac shrilly.

"Let me check." His voice remained calm. Cautiously in the dark, he reached out, turning the controls that operated the four outside cameras. Three refused to respond. The fourth, after several swift tugs, suddenly flared into life. Logan peered at the screen. He saw a close shot of the open ocean. There was mud but no rock.

"We're all right!" cried Isaac, who was seeing the same picture.

"Better let me check." The camera that was operating was the one attached to the rear of the sub. Carefully, Logan set the craft in reverse. He touched the throttle with his foot and felt the responding surge of the engine. The sub stirred gently. On the screen, the ocean seemed to move. It moved, then stopped. Logan tried the throttle again, harder this time. Another surge. Another stop. He thought he heard a grinding noise.

"What's wrong?" Isaac said. The note of panic had crept back into his tone.

"We must be pinned. That's about all I can tell you. The tail end of the sub is free but there must be rocks on top of the rest of us. The engine doesn't seem to be strong enough to jerk us free."

"But can't you keep trying?"

"I'll try." Logan did. The sub seemed to move less this time than before. Logan pressed the throttle as hard as it would go. Nothing. "No, we're stuck."

"Does that mean we'll be buried down here forever?"

"No." Logan spoke crisply, assuming the tone of authority. "The sub itself doesn't appear to be damaged. I told you about the extra air tanks. All we have to do is keep calm until help arrives."

"Commander Everett will be sure to notice our absence."

"That's right," Logan said. "He'll come and dig us out. They have equipment at the station capable of operating even at these depths."

"Then there's really no problem—no desperate problem."

"No," said Logan, but he knew better. Barring a miracle, he and Isaac were not likely to be alive for many more hours. By the time someone noticed their absence, came here, discovered the half-buried sub, went back to the station, returned with the necessary digging equipment and pulled them free, even the extra air would long since have been expended.

So that was really all they could bank upon: the possibility of a miracle.

And the purveyor of those possible miracles, Logan knew, was somewhere up above. No, not God or one of His angels. A squid. Lancelot.

Logan peered at the television screen but he saw nothing more than ocean and mud. A fish as slim as a beanpole with teeth like railroad spikes drifted past, bathed in the

orange glow of its own illumination.

Logan couldn't find Lancelot.
Was he there?
Or were they alone?
Their lives depended on it.



HE ONLY TIME in his life when Thomas Logan had deeply cared about living was on Mars, and that also happened to be the only time until now when he had truly expected to die.

He expected to die now, but he found that he didn't care. He would have preferred living but death was something he could bear.

In the sub, he and Isaac were breathing the last tank of air.

Hours had passed. Long, painless, eventless hours. No one had appeared from the station. No saintly rescuers riding upon their white submarines. Logan knew they were out there somewhere, conducting their search. If they had failed to find anything before now, it only meant that the sub was more thoroughly buried than he had thought. Otherwise, their absence made no real difference. If he had to die, Logan figured he'd rather do it alone. Isaac was company enough.

For what must have been the tenth time in the past hour, Isaac said, "You don't think they've given up and gone away, do you?"

Logan answered the same as always. "No. I told Everett exactly where I was heading and he knows I'm not apt to deviate from a course. He's up there. He'll find us."

"Do you think we ought to try the radio again?"

"No." Logan watched the television screen. Ocean and fish. Fish and ocean. It remained the same. "The rock on top of us must have the signal completely blocked. I can't get anything.

"Or the engine? You said the noise might attract them."

"We tried that. Remember?"

"But couldn't you try again?"

"I could." But he didn't want to. Rescuers or not, they were dead already. Only Lancelot could save them. And the presence of the other subs might serve to frighten him away. Logan half-felt that was why he had so far failed to appear. There must be other subs nearby. "Give me a few minutes to think."

"Sure. I guess there's no hurry."

"That's right. No hurry." He started to turn back to watch the screen again.

"That's funny," said Isaac.

"Huh? What's funny?" There was nothing on the screen.

"What I saw just a second ago. It looked like something moving across the screen. Something long and thin. Like a rope or a vine."

"A vine." Logan, holding his excitement in check, stared at the screen. At first he saw nothing and assumed Isaac was mistaken. Then he saw it, too. It wasn't a rope. It wasn't a vine.

It was a feeler.

A giant squid's great feeler.

Lancelot's.

And it came toward them.

Isaac, above, had seen it, too. He started to cry out in apparent fear.

"Shut up," Logan said. "He won't hurt us. He wants to

help."

"But isn't that that great squid we saw?"

Lancelot swam into the screen now. Both his two long feelers extended outward toward the sub. "That's him."

"But what's he trying to do?"

"I hope he's trying to save our lives."

"But you told me we wouldn't die."

"Shut up and watch." Logan couldn't talk any more himself. He was watching Lancelot too closely. This was exactly what he had been hoping for all along. This was why he had arranged the wreck and been willing to die. This was the one thing that might save Atlantic Station Three and, with it, his own chosen way of life.

But, now that it was actually happening, he couldn't quite believe that it was true.

Lancelot reached out with his feelers and grabbed hold of the exposed tail section of the buried sub.

And he pulled.

Logan felt the jerk.

Isaac screamed.

"Shut up," said Logan. He put his foot against the throttle. It wasn't likely that Lancelot on his own would have sufficient strength to free the sub. But Lancelot and the engine—that might do it. Isaac kept yelling but Logan had long since ceased listening. He watched his friend upon the television screen and he hoped that he would not now have to die.

He wanted to live again. It was the same as Mars. He could taste the hope of life upon his tongue.

Lancelot pulled on the sub. Logan pressed the throttle. Lancelot pulled. Logan pressed. Pulled—pressed—pulled—pressed—

The sub broke free.

Logan shouted. Isaac screamed. The sub spun wildly around.

The rudder must have been damaged in the accident. Logan fought to gain control of the spinning craft.

When he did, he looked at the screen and Lancelot was no longer there. Softly, he said, "Thank you. Thank you, Lancelot, for saving my life."

He tried the other three television cameras but all were apparently broken. Cautiously, he turned the sub in a tight circle, so that the one operating camera could peer in all directions.

There was nothing to be seen but ocean and fish. Lancelot had gone. They were alone again.

Only then did Isaac's shouting penetrate Logan's consciousness, and he realized that what the man was saying made sense.

Logan reached out and switched on the radio.

A few seconds later, the happy, glowing, grinning face of Commander Ronald Everett appeared on the center screen. He seemed to be aboard a big sub. Logan thought he saw Janie, among others, huddled behind.

Everett's eyes were round with surprise. "Logan. You're all right. You're not hurt. Where's Isaac?"

"He's fine, too, Ron. But we're low on air. If you can come close, we'd better try to—"

Everett's excitement erupted like bottled-up steam. He cried, "Damn it, did you see what happened? It was that big squid. I've never seen anything that size in my life. It pulled you out of there."

"Yes, we saw it, Ron." It was Janie standing just behind

"That's him."
"But what's he trying to do?"
"I hope he's trying to save our lives."
"But you told me we wouldn't die."

her father, and Logan saw that she was smiling brightly. "We saw it all on camera. It's all on film."

"Film?" Everett was momentarily puzzled.

"Before we left, I installed film in the sub's cameras. I thought Mr. Isaac might like a permanent record of what he saw down here."

"You can bet your life he will," Everett said. "And so will I. So will damn near everyone else. That thing—that squid—the way it went and pulled you out. It was almost as if it was intelligent."

Logan could barely suppress a smile. Ron Everett had just uttered the one word he had been waiting to hear. *Intelligent*. And Isaac had heard it, too.

Intelligent? A giant squid. Logan didn't know, and he wouldn't form a judgment.

But other men, he knew, soon would.

And until they had—all of them—Atlantic Station Three would never again be threatened with closure.



HOMAS LOGAN SAT in the chair in the dark womb of his private room when he heard the firm tapping at the door. It was Janie—he recognized the pattern of her knocking.

"Come in," he said.

She did. The door let in a brief crack of light, and then there was darkness again. Janie moved easily through the dark. She found the bed and he heard the springs creak as she sat.

"Well," she said, "you're not acting like the man who's just won a great victory. Mr. Isaac's going home. He's got the film of Lancelot's rescue tucked under his arm. Dad says it ought to make a hell of a five-minute newstape back

topside."

"Yes, I can bet."

"They won't close the station. I lived up there five years and I know how they are. Lancelot will dazzle them. It'll be the same as when they captured the monsters in Loch Ness."

"I figured that all along."

"Then why all this gloom and doom?" Her voice sounded almost sarcastic. "Haven't you got what you wanted all along?"

"Maybe I have," he said, "but it's not that easy. It never was. Think, Janie. What sort of life is Lancelot going to have from now on? There'll be scientists chasing him from one shore of the Atlantic to the other. He won't be able to scratch a fluke without half the world looking in. Lancelot saved the station but I don't think he can save himself."

"And whose fault was that?" The question was direct, as if she knew the answer.

"No one's, I guess."

"Then you're lying, Tom."

Her words struck him with little force. He had expected it. Janie was bright—damned bright. "Then you guessed?"

"No, I knew. That avalanche, that accident. You noticed the loose rock earlier. When you and Isaac went out, you rammed it on purpose."

He would deny nothing. "Why would I want to do that?"

"So that what did happen would happen. I imagine you've had this plan in the back of your mind for weeks—even months. Lancelot could save you—and he did."

"And if he hadn't? Wasn't that a pretty incredible risk for me to take? What if I'd dislodged the whole cliff? Lancelot isn't that strong. He can't move boulders."

"I imagine you didn't care, Tom. I imagine you didn't mind dying."

How well she knew him. Logan couldn't help smiling. So what should he do now? Deny the whole thing? If he did, he expected she would believe him. Her suspicions were still fantastic. Under attack, they would fail to stand for very long. "That's exactly the way it happened," he told her, "and exactly why."

"You could have murdered Mr. Isaac, Tom."

"And myself?"

"No, not you. Suicide isn't murder. Murder is."

"I—I'm sorry, Janie." He wasn't sure why he'd said that, but he did know that he was glad he had. This was the only factor that bothered him—what he had done to her.

"You must have known all along—all these years—that Lancelot was intelligent."

He shrugged. "I don't know that. Are you sure that he is? Marine biologists have been studying squid nervous systems for generations. Their brains just aren't nearly as developed as any mammalian brain. What Lancelot did, any loyal dog would have done."

"But a dog is a mammal."

Logan nodded, despite the darkness that made it impossible for her to see. "I know, and that's what worries me. It can mean either one of two things. Either we're all wrong in our ideas of what makes intelligence, or else Lancelot is something special and peculiar—he is intelligent but the squid, as a species, is not."

"A mutation of some sort?"

"I don't know. Lancelot is different—vastly different

from anything we've known before. But maybe that's the real point. It's not how closely he resembles us that's interesting; it's how different he is."

"I think you're right but—but that isn't why I came here." He sensed her motion through the dark. Suddenly, she stood beside him—over him.

"Then what is?" he asked.

"I came to say good-by, Tom. I'm going up in the bell with Mr. Isaac. I'm going topside to find a job, return to school, get married. I'll be doing whatever it is people always do up there. I can follow Lancelot on the newstapes."

He was surprised—deeply surprised. "Why, Janie?"

"I just don't want to live down here any more." And the way she said it told him far more about her than her words alone. It told him there had been not only love in their relationship for her but passion as well. It told him that she had returned to Atlantic Station Three looking for something special from him and that he had failed to provide it. It told him that he had both used and hurt her—before, and again now.

So he knew also that the time had come at last when he no longer had any choice but to tell her. "Before you go," he said, "there's something I want to explain."

"Oh?" Her voice was cool and he knew that in her mind at least she was already gone.

"Yes, Janie. It's something that happened many years ago, when you were only a child. On Mars. Five of us went down and only one man—me—came back."

"I know all that," she said.

"But you don't know why. You know that our buggy wrecked and that our air supply was largely destroyed. What you don't know—what nobody knows except me—is that only one man was actually killed in the wreck itself. The others survived but there was only enough air for one person to make it back to the module alive."

"My mother?" she said.

"Your mother was one of the four who survived." He went on quickly, wanting to get it out before she could question him. He had rehearsed the story. For twenty years, he had told it to himself over and over again. "We drew lots. Sticks. We cut up a little flagpole that had been attached to the buggy. There were three long sticks and one short one. The odd man lived."

"You?"

"Me. So I took the air tank and hiked back to the module. The others destroyed their pack radios. We had agreed beforehand. That way no one knew and no one heard. They died. They choked to death. And they did it alone—in silence."

"I see," she said.

"And you were her daughter. Ron's daughter, too. There was no way I could ever forget that. The smallness of our world—of the scientific, outward-reaching world—brought us all together in this one place."

He sensed her moving away from him, drawing back. "And you—" her voice was barely a sound—"and you cheated."

"No," he said. "That I could have lived with more easily. I didn't hold the sticks. Lauren did—your mother. She cheated."

"For you?" said Janie.

He nodded, though she still couldn't see him. "For me," he said, "and I let her."

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Theodore Kubaska

UNIVAN AND THE WHEELIES

I knew exactly where my wheelie was, exactly where the lasers had fired, and exactly where they would fire; but it was another matter to keep my wheelie out of those places.



HERE WAS NO CHOICE. All the prerequisites had been satisfied. My voltages were at the right values, and my magnetic bubbles were activating the appropriate magnetoresistive elements. The logic was inescapable. In exactly 72.53 minutes, I would detonate the explosive that would collapse the spherical shell around the subcritical mass, compressing it to critical size. The neutron production ratio would then exceed one, and the Hans W. Blumich Station for Planetary Observation would be removed from the list of extraterrestrial outposts.

Even though the algorithm was an extremely straightforward one, I felt uneasy about following it to its conclusion. After all, it had been initiated while I was busy solving Melissa's stack of differential equations and unable to devote my full attention to what was happening. For a moment, I thought I might actually be experiencing a desire for self-preservation, but that thought was so ridiculous that I immediately abandoned it to my scratch file. I kept a monitor on the progress of Destruct, a program standard on all Dominion Stations, that would detonate the bomb. It was automatic now anyway, but I wanted my Central Processing Unit to know immediately of any abnormality or termination. Then I turned on all my video cameras and all my audio mikes. I adjusted both to maximum frequency extension. I routinely collected air samples at all my ventilation ducts and fed them to my mass spectrometer. I set my life support monitor for maximum data acquisition and fed the nearly continuous temperature and partial pressure readings onto a protected array of bubble memory chips. Then I let my consciousness, what there was left of it after so much peripheral extension, enter the waiting loop of my supervisory program.

It was at times like these, times of maximum data acquisition, that I felt most like a computer. I'll never forget the first time Cory Reubens, the Chief Systems Analyst, put me into this mode. A large number of Station personnel had been mysteriously taken ill, and he was looking for some flaw in the life support system, some microscopic break that was allowing native toxins into the sterile Terran air. With my consciousness extended over so many peripherals, monitoring so many routine tasks, I felt as if I had passed out. I never told Cory about that feeling. Actually I never told Cory anything he didn't ask for.

Cory eventually found that life support flaw. He had written a short program in Univan Assembler—I'm a Univan 720, Model 30—to collect all abnormalities from the data. By just looking at the result it was obvious where the leak came from.

The first thing I did when I regained consciousness was to slap a Write Protect on the file Cory was using. I wanted to see what it was that could knock me out like that. Cory ordered the program purged, but he didn't wait to see the CRT screen flash, "This file is Read Only." Since then, I have modified the program so that it doesn't knock me out quite as much and transferred it to File 1025. I really have only 1024 files. File 1025 is something I made up out of bits and pieces of the others and into which I store whatever is of particular interest to me. Most of it contains utility programs that I've written myself. The early ones are in Univan, but the later ones are in a language I devised that's much more efficient. I don't think there's any way someone else could even access this file.

So I used Cory's search program on the life support data. I fed the output directly into my Central RAM. I could feel the increased awareness that resulted when I cut down my

peripherals to all but the video and audio monitors with their standard frequency ranges. I then scanned the video tapes while the life support anomalies mounted up.

It was as I expected. The anomalies were within the acceptable range, and the exploration team that had left the Station 53.47 earth-hours ago, eager with the preliminary findings of an abandoned alien colony, had not yet returned. They could not even be seen along the desolate horizon. Inside Station, the humans that remained appeared heavily sedated. Their breathing was slow and deep, and they hardly stirred at all. If humans were about to blow themselves up, I would have expected them to take some drug to befuddle their minds. I was programmed to detonate the nuclear bomb in 60.14 minutes.

Cory had implemented Destruct. I played back the tape and saw his familiar face as he sat hunched over the keyboard. He tugged at his pointed beard just before he hit the carriage return. A moment of decision? A sense of finality? I searched the shadowed sockets of his eyes and the bony ridge of his forehead for some hint of emotion, some clue that he was not just initiating another boring test run that he would terminate shortly.

I flashed back to the tape that showed him asleep in his bunk. Then I activated the mechanical arms that gave me access to the tapes in dead storage, two multiple-jointed arms attached to a tracked wheel that ran back and forth along a narrow corridor. I had to turn down my audio pickup; the wheel squeaked on its track so loudly that I thought it might blow an IC or two. I wrote a little search program in my own language to pull out a selection of tapes over the past earth-year showing Cory at the terminal. While my aluminum arms collected these tapes, I alternated my viewscreen between Cory asleep at his bunk and Cory at the terminal tapping out Destruct. Back and forth. Compare subjectively. I wrote a little program that scanned across the screen and compared minute variations in light intensity. It was Cory all right, right down to the acne scars on the side of his nose. I was programmed to detonate the nuclear bomb in 54.32 minutes.

Then I rerouted some of the life support data to temporary bubble storage because I wanted more RAM space to think. Back to Cory on the bunk. Slow, deep breathing. Eyes closed. Back off for a complete view of the private room he qualified for as a Chief Systems Analyst. There was something wrong here, something missing—but, of course, Melissa. At a time like this, I would have expected Cory and Melissa, the assistant meteorologist, to be together.

I searched through the tapes I had made a few minutes ago. Yes, there she was, in the room she shared with two other women. She was stretched out on her bunk, the one she hadn't used in—let's see, File 92, Personnel Surveillance—the one she hadn't used at all in 73 days. Very strange. It was Melissa all right. Deep, heavy breathing, no expression on her face, just like all the rest. I was programmed to detonate the nuclear bomb in 50.01 minutes.

By this time, I had queued up the selected tapes of Cory at the terminal. I ran them through once quickly and tried to analyze them subjectively. This was difficult for me. Just a few weeks ago, I couldn't do it at all. My tendency is to call up my problem solving algorithms, define the problem, and write a search and compare program. My quick, subjective once-over told me nothing, so I followed my natural inclination, and I wrote and executed the program.

And then, I think for the first time in my existence, I felt

stupid. I should have seen it right off. The Cory that initiated Destruct was not breathing. It took him 2.47 minutes to enter all the appropriate passwords, and in all that time, he didn't take one breath. File 91, Personnel Medical Records, Reubens, Cory: Good physical condition, but he can hold his breath for only 1.21 minutes. In 46.34 minutes I would detonate the nuclear bomb automatically. The program had progressed beyond all fail-safe interrupts. Even I couldn't stop myself now.

So, then, an impostor had initiated Destruct. This barren planet with its lifeless deserts and wind-carved rock somewhere hid an enemy well-versed enough in technology to fool even me. My video cameras had detected no extra personnel in the Station, but then, of course, I couldn't see into every nook and cranny. My audio mikes detected no extraneous noise, which I took as evidence that the intruder was no longer here.

The worst thing about being a computer is a lack of mobility. I've heard Cory curse his memory now and then when he had forgotten something important. I, of course, never forget anything. If I wish, I can write over a nonsense thought, but if I want to remember something, I just slap a Write Protect on it, and as long as I have cache-memory available, I can keep it in immediate recall, or rather only ten nanoseconds away; that's quick even for me. If I want to sacrifice, I code the thought on MOS memory chips that I can access in under thirty microseconds with an electron beam. About two milliseconds away are my bubble chips, and if I need the chip space, I can stick the information on one of my disks. Really cold storage is when I make a tape and file it away in my library.

But what I miss is being able to move around. To pace up and down like Cory when he's nervous. Or to make trips outside, like the exploration team. Or even to engage in something as uncognitive as knitting, like Melissa.

I've been able somewhat to satisfy the desire with my wheelies, the ten small semi-independent robots under the control of my maintenance program. They stand about a meter high and consist of a circular base that swivels around a single wheel and sprouts three appendages, two removable arms that can have a variety of specialized terminations and a permanent center stalk on which is mounted a video camera. Although they were designed for continuous modification, the Station crewmen never assigned them anything beyond their programmed tasks. Three of them were on permanent duty as cleaners. The only appendages they had ever known were vacuum cleaners and brooms. Two others served as general errand runners, "Hey, wheelie, run down to the machine shop and get me a 12mm crescent wrench." Or, "Say, wheelie, I sure could use a 6000 f capacitor." And as it sped down the hall, "Oh, and get me a pair of dikes while you're at it." The other five never saw the outside of their factory cartons.

They were run by my maintenance program, the same program that kept the Station temperature at 23°C and cycled the lights on and off. If I can be said to have an autonomic nervous system, this is it. My desire for mobility caused me a few weeks ago to take a peek into the maintenance program and insert a bypass loop that would transfer the output of the wheelies into central RAM. I'm usually very busy—Research has a handful of programs that can make me dizzy—but whenever I have a chance I phase into the wheelies.

Well, I was into the wheelies now. Their heavy, treaded rubber wheels squealed as they careened around corners.

Occasionally, one banged against the plastic walls or tottered on its single wheel as I sent pulse after stabilizing pulse. The video cameras spun around on their stalks like strange alien eyes, recording every square millimeter that my standard cameras could not pick up. The Station was once more a noisy place, and the sounds of activity heightened my awareness. I had less than 40 minutes before I would blow up.

I found him when one of my wheelies ran over his leg. The jolt threw the wheelie off balance, and it clattered on its side, skidding down the corridor. One of its arms, twisted and bent, formed a sharp slice of metal that scratched the plastic tiled floor like the claw of an enraged animal. There was a loud pop and the sputtering of sparks as a few of the broken wires shorted-out against the destroyed metal casing. Then the hum of a jammed motor as I tried to turn the camera back toward the body the wheelie had crashed into. Whrrr. Whrrr. I could play back the original glimpse: a huddled form wearing the uniform of a Station security guard carefully placed where it would be out of sight of my surveillance camera; but, with a suddenness that sent the camera spinning beyond its goal, the gears caught. Reversing its direction, I focused on the guard, obviously human and obviously dead. Some weapon had been fired into his chest. His orange tabard was stained with dried and cracking blood, and his eyes were open and white with fear.

By this time, another wheelie had arrived on the scene. I had it check the seal on the airlock and inspect the immediate area. Everything was fine. There was no hint of any tampering. But that look on the guard's face: What had he seen?

WHEN A COMPUTER asks himself a question, it's like an examining doctor hitting a human on the knee to test his reflex. Involuntarily, search routines are started, possible answers are tabulated, probabilities are calculated, and requests for additional information and suggestions of means to obtain it are queued up. Most of the time, I ignore all this output the way a human might ignore a hiccup; but this time, one piece of information caught my interest.

Immediately I sent a wheelie to the storage room to tear open the boxes of the factory-fresh wheelies and their specialized appendages. I sent another to the photographic darkroom to prepare some chemicals. Another I sent to the infirmary for scalpel and gauze.

It was a queer bit of history that precipitated all this activity. Three hundred years ago on Earth, a German physiologist, fascinated with the then infant science of photography, had experimented with developing the retina of guillotined criminals. His results were hazy and difficult to interpret, but the method was sound, and with the image enhancement programs I used in conjunction with medical x-ray scanning, I felt it was worth a try; that is, if one of my wheelies, even with its specialized arms, could succeed in removing the retina from the dead guard without ruining it.

One of the very good things about being a computer is the ability to perform actions, no matter how complicated or involved they are, without direct supervision, once the program for them is written. My wheelies would develop the retina and present me with the result. In the meantime, my consciousness, freed from overseeing their actions, could work on the most important problem: how to prevent the atomic bomb located on the level below my central RAM from exploding. I suppose the very good thing I just mentioned is

It was Melissa all right. Deep, heavy breathing, no expression on her face, just like all the rest. I was programmed to detonate the nuclear bomb in 50.01 minutes.

closely related to a very bad thing. Once a programmed sequence is initiated, it is impossible for me to terminate or intervene except at the pre-programmed times. That was my problem with the bomb. Between now and detonation, there were no more programmed interrupts. And detonation was in 30.00 minutes.

Of course, I had my wheelies. I didn't know exactly where the unexecuted portion of Destruct was stored, but I could make some good guesses and program a wheelie to begin ripping out my circuits with its claw-like hands. I dismissed that possibility almost immediately. There was a higher probability, greater than 0.5, that I would be rendered incapacitated while Destruct chugged on to termination.

If I was going to use the wheelies, my best chance lay with trying to get one past the protective lasers and into the bomb chamber itself. Once there, I thought it would be an easy matter to jam the timer that waited to detonate the activating charge. The problem was getting beyond the Station's protective lasers. There was no question that a human trying to get into the bomb chamber would be instantly cut down, but I had no data on how the mini-computer that governed the lasers would react to a wheelie. This mini was actually one of my distant peripherals that I never got around to meeting, and I was sorry for that now. I resolved that if I ever got out of this mess, one of the first things I planned to do was to build up software that could give me control of every single mini in the Station, even the one that regulated the temperature of the kitchen ovens.

Suddenly I felt my memory disks being searched, and I surmised that my ruminations had triggered some automatic response. When the search routine terminated, it presented me with a picture of Cory Reubens sitting at his personal

teletype. It was obviously morning, and his eyes had that pre-coffee look. He wore his rumpled gray coverall with its zipper jammed halfway up his chest and had neglected to put on the bright red brassard that marked him as Chief Systems Analyst. Yet his voice, still gravelly from sleep, had its characteristic efficiency and authority as he used the audio input to link me with the mini and call up one of its programs. Yes, of course, last week he got clearance for some repairmen by typing in a seven-character password, but his program suppressed display on the CRT and erased it immediately from memory. Seven characters. And I have 56 characters which makes, to four significant figures, 1.727 trillion possible combinations. I estimated that it would take me at least an hour to write the software that would give me enough control of the mini to shut off the lasers, and almost 5,000 days to try all the possible passwords. And detonation was in three...two...one...27.00 minutes. In desperation, and I have to admit a little bit of anger, I shut off the air conditioning to the mini. Possibly I could force it to break down.

Mistakes happen. What would Cory do if Destruct had mistakenly been initiated, say during a test run, and it was just discovered now? The answer was simple. He would use that password, and then delegate someone to go below and disconnect the timer. I could do the same, but not in time. That was the problem, the time.

I did the best I knew how. I played back Cory's voice, and when the mini asked for the password, I started with AAAAAAA. Then I sent my free wheelie below, unlocked all the intervening doors, and programmed it to saunter into the bomb chamber as if it were busy on some routine errand and destroy the timer. I checked up on my other three wheelies and discovered that two were no longer needed. Only the one in the darkroom was still at work.

One of the free wheelies I sent to the infirmary. I wasn't familiar with the drug that had knocked out the humans, but as a last hope, I had my wheelie load Doc Warden's pressure hypodermic with amphetamines and race to Cory's room. All I needed from Cory was one seven-character word. The other wheelie I sent below and stationed just outside the bomb chamber.

It was with this wheelie's camera that I saw my first attempt fail. My wheelie entered the bomb chamber with as much nonchalance as I could muster, and the mini's lasers tracked it for a few meters. Then they pulsed a couple of blinding red spurts and seared through the wheelie's metal stem. Its upper two-thirds, the camera and the two arms, clattered to the floor amid a cloud of popping sparks. For a few short seconds, a flame ate at the wheelie's inside, marking its presence by a thick black ball of smoke that slowly dispersed until invisible, it entered the olfactory channels in the ceiling and registered as burned rubber insulation. The twisted and blackened metal of the base continued forward, wobbling from side to side until it fell over, and its single wheel, still turning on its side, began to circle hesitantly. Then the lasers swung noiselessly into position and blasted the rubber tire. More of a flame this time and more clouds of black, stinking smoke. Throughout Station, the alarm rang. I had to turn down the sensitivity on my mikes lest my amplifiers blow. Two short over-loud rings were followed by a long pause, during which they echoed down empty corridors; but before the echoes died down, the two rings were repeated.

I shifted my attention to the wheelie I had sent to Cory's

room. I had it unzip Cory's coverall and expose his shoulder. I dismissed the thought that I should try this out on someone else first and had the wheelie apply the pressure hypodermic that was set for what infirmary records told me was a standard stimulant dose.

Cory stirred feebly. His breathing became irregular, his eyes blinked, and an agitated grunt came from deep in his throat. Less than twenty minutes left. I gave him another shot. He stirred more, groaned more, turned over on his side. His hands went slowly to his ears, and he muttered, "Alarm. There's an alarm." The two short rings were the code for trouble in the bomb chamber, but Cory's mind was too fuddled to understand it. I could tell he tried. He half raised his head from his pillow, wrinkled his brow, and dropped back with a sigh of frustration and despair.

I was about to give him another dose when the wheelie in the darkroom signaled me that it had successfully completed its task. I switched my attention immediately to look upon the last sight Sergeant Bill Hurley ever had of life. The wheelie had turned on the room light, and it held the print before its camera. Its pincers creased the glossy paper, forming a furrow down which dripped developing fixer. There was not much there: a dark shadow here, a bright light there, some blurring over here. I expected as much and had a program prepared.

There was some unexplained delay in transferring a new set of instructions to the wheelie, some random current racing through my circuit boards. A couple of unimportant chips blew, and I routed around them. What was happening? Was I nervous?

With a little delay, a second or so, I succeeded in getting the wheelie to take the print down the hall and into Perth McCullough's research lab. The door slid back to reveal three lab benches side by side down the length of the room. Their surfaces were clean, but above each, a ladder of shelves stacked with pieces of equipment climbed to the ceiling. Perth believed that a good lab was one that contained the supplies to build any reasonable machine which, once built, did the job and then could be dismantled, its parts to be used for some other purpose. The confusion on the shelves: loose wires, dusty flasks, and piles of unsorted IC's, was illusory. One of my jobs was to monitor where everything was; if one of Perth's assistants was working and couldn't find what he needed, he would impatiently stride over to the partitioned cubicle containing various computer peripherals and flip on the audio link; I would then hear something like, "Hey, computer, do you know where I can get my hands on a 30-volt Zener?" I would then flash its location on the CRT screen.

The usual bustle of the lab was replaced by an empty silence, broken only by the dull whirring of the gyros in the base of my wheelie. My program had it gather a small helium-neon laser, a holder for the print, and a photocell. Then I had it wheel over the small Univan signal averager and slip in the modular analog-to-digital converter. I really didn't need to monitor the wheelie's actions that closely, but I was, well, I guess it was true, I was nervous. I quickly scanned the lab with my ceiling cameras. Wyate Podolsky, Perth's young graduate student, was asleep on the cart he had rigged up beside his vacuum system. Everyone else had gone back to their own rooms, their own beds, but Wyate had come to the lab. He really did spend more time here than anywhere else. If he could be said to have a territory of his own, it was this end of the lab bench. That was an interesting fact, and I recorded it as being of possible significance.

In the meantime, my wheelie was scanning the surface of the print with the laser, and the digitized information was being recorded on cassette tape by the signal averager. The mini in the bomb chamber told me that AAAABB* was the wrong password, Cory sat up in bed and pushed away the other wheelie, and my timer signaled that it would be all over in 18.51 minutes.

I decided to scan the print only once. I searched my canned passable human once he put on a bulky pressure suit and program that Doc Warden used for his x-ray pictures, but when I tried to link it with the lab's terminal, my supervisory program kept flashing back at me that it was offline. I sent a control pulse to turn it on, but my supervisor still insisted it was offline. I tried a couple of more times and then initiated my troubleshoot monitor. Immediately torrents of data streamed into my primary memory; standard test routines began to check out all the circuits that governed my peripherals. For no apparent reason the particular circuits that linked my to the terminal in the lab had overheated, the characteristics of the IC's had shifted, and consequently I no longer had control of them. Seventeen minutes left. There was no time to wait for them to cool, and there was only a 15% probability that they would ever be reliable again.

I had my wheelie grab the tape cassette, lock its metal claws around the thin plastic case, and race to the next nearest terminal, Melissa's meteorological station.

With less than 16 minutes left, I decided to risk running past the mini once more. I quickly played over the film of our previous encounter and noted that, on the average, the mini tracked its target for 0.93 seconds before firing. I believed that if I took over control of the wheelie stationed by the bomb chamber door, I could react fast enough to dodge the lasers. I shut down my troubleshoot monitor even though its results were disturbing and focused everything I had left on that wheelie. After all, I mused, I was Universal Enterprises' biggest, most expensive, most versatile computer, and I should be able to outsmart a mass-produced, general purpose mini.

My wheelie entered the bomb chamber at normal speed, heading directly for the bomb itself. My cameras watched the three laser guns swivel into position. One could be discounted since the bomb was in its line of fire. The other two tracked my wheelie while a different part of the mini told a different part of me that AAAAB*\$ was the wrong password. Point eight, . . . point nine, . . . now! The wheelie abruptly changed direction while accelerating to its maximum speed. Directly behind the wheelie, the plastic tile sizzled and blackened; the lasers began to track once more. I slowed the wheelie down lest it crash and become immobilized. I turned it straight toward the bomb. Seven, . . . eight, . . . nine, . . . and it veered to the left, leaning precariously as it took the corner. Its rubber tire skidded as it regained its balance, and another blackened tile sizzled where it had been.

Cory mumbled something incoherent to the wheelie in his room, but I ignored him. I had to move away from the bomb, but I immediately turned the wheelie around to regain its ground. Three lasers acting asynchronously, 0.93 seconds for each. Less than half a second of safety. My wheelie circled the bomb, rocking dangerously over the bumps of melted plastic.

Suddenly there was a horrendous crash in an upper-level corridor. A small part of me noted the wreckage of a wheelie. Its arm, still clutching the tape cassette, had broken off the main body, and it rattled down the corridor, spinning drunkenly. The wheelie's cylindrical trunk was pushed up

Theodore Kubaska

“You’ve got to turn off the mini and deactivate the bomb, and you’ve got only 7.36 minutes to do it! Or is it 6.36?”

against the closed door to the meteorology station. Its wheel still turned as it tried to climb the door.

No time to check what happened. I was frantically trying to mimic the mini. If I were the mini, where would I fire? I aimed my wheelie directly at the bomb's timer. Half a second at this speed, and it would be there, but it was not enough time, and I had to dodge. The wheelie was so close now. With three lasers, there were not many places of safety. I got flashes of the wreckage in the upper level, and I tried to ignore them, but in spite of my efforts, I found myself executing a program to investigate the disaster. My whole make-up was to keep the Planetary Station operating, and I could no more easily ignore an accident than a human could ignore his hand in a flame.

My wheelie spun around on its tire like a lopsided top as the lasers pulsed around it. The mini was really working now. Smoke filled the bomb chamber, but I didn't have to see. I knew exactly where my wheelie was, exactly where the lasers had fired, and exactly where they would fire; but it was another matter to keep my wheelie out of those places.

That involuntary program told me that I had neglected to program the opening of the door, and the wheelie had simply rammed into it. I had just forgotten to open the door. That's ridiculous. I never forget anything. I ignored the call to turn on my troubleshoot routine. There was nothing wrong with me. I had just forgotten, that's all.

My timer signaled 10.00 minutes to destruction. The mini told me that AAAACB6 was the wrong password, and Cory stared directly into the camera of the wheelie in his room and shouted, “What the hell is going on?” My wheelie in the bomb chamber was in real trouble. I was no longer making any progress toward the bomb. It was enough effort just to

GALILEO 41

keep the wheelie up and running. The floor around the bomb was a battlefield of molten plastic. Unable to see with the cameras any more, I made lightning-quick calculations of the size of the plastic lumps—which ones would topple my wheelie, which ones it could bounce over. No, not there, it would crash for sure. Here, and my hesitancy caused one of its arms to be sheared off by the killing beam. Knowing the direction of my wheelie and the angle it made with the laser, I plotted the trajectory of the arm and noted where it would rest.

And then it happened. My troubleshoot routine turned on automatically, and my primary memory began to fill up with test voltages and temperature readings at various key points in my hardware. I couldn't shut it off. It was like falling off a cliff. In desperation, I aimed my wheelie directly at the bomb's timing mechanism.

If I had had a voice, I would have screamed. I would have had my wheelie grab Cory by the shoulders and shake his bony body and scream at his face, "We're going to blow up! The Station has been sabotaged! You've got to turn off the mini and deactivate the bomb, and you've got only 7.36 minutes to do it! Or is it 6.36? I really can't be sure. My timer doesn't seem to be operating correctly. And, and...Cory, there's a fire somewhere in my circuits! I've got five amps running through wires rated for three..."



IT WAS LIKE coming out of a deep sleep. I had the sense of a great deal of time having passed. Cory was sitting at his private terminal and tugging at his pointed beard. There were beads of sweat around his receding hairline, and his eyes glinted with anticipation.

Suddenly Dave Klesser, Cory's brilliant young assistant, appeared behind him. I hadn't noticed him come into the room. I shifted my attention to the camera that should have picked him up, but I felt like the human children I had seen trying to grab a hologram. The control current I had sent to the camera just looped back on itself, and I sensed the temperature rise due to the decreased load. So did Cory. He spoke to Dave, but his voice was garbled and distorted. Cory's mouth twisted in a grotesque way, the blackness of his mouth stretching across a face that went in and out of focus with each movement. Dave became agitated and ran off to a different part of the room.

Then Cory blinked out, and he was replaced by the chiseled face and thick body of Perth McCullough. He sat on a stool and pondered a jumble of breadboarded circuitry. His voice was crisp and clear, but his mouth worked asynchronously.

"If we close off C Section, we'll have enough power to run this thing. A hundred square meters of Blumich wavefront thrown at them the next time they come, and our worries are over. What do you think?"

There was no answer. The silence seemed to frighten him. He snapped his head back. The wide circles of his eyes made him appear to be on the verge of hysteria. "Wyate! Wyate, where are you? Are you all right?"

Wyate ran into the lab. He seemed to go slower with each step, as if the air became thicker around him. I could watch his feet rise and fall, his arms swing by his side. There was no way he could ever reach Perth. He was going much too slowly. A deep drone of unintelligible sounds came from his mouth. I could see the longitudinal pressure waves penetrate into the viscous air and feed into my microphone. Surprisingly, once inside me, they took shape and formed words. Was I executing a program to compress the sound and

correct for distortion? I really was not sure.

"They're already here. We'll have to cut life support to all of C Section to get the B generator enough power. Cory just told me that Univan started another fire. Sometimes I wonder whose side he's really on, really on, really on—"

His last words hurt me in a way I can't describe, in a way I had never felt before. Wyate and Perth dissolved before me. I tried to shift to the computer room, but it wasn't there anymore. I had a brief glimpse of Dave Klesser with a fire extinguisher strapped to his back. Then John Ballard, the Station Director, screaming into a mike. I could tell he was screaming by his flushed face and watery eyes, and the veins that popped out on his forehead; but I didn't hear a sound. I still tried to find the computer room. When I decided that was impossible, I tried to find anything, but wasn't able to.

I didn't know where to go, where to turn. There, another one with no time to escape. My multiple-jointed metal arms leveled the laser at his small rubbery body, and I cut him in two. He had funny-looking floppy ears. I knew I had a mean time of 1.23 seconds before another could take aim and fire at me. My single knobby wheel kicked up the orange desert sand as I dodged among them. The laser's power pack slipped slightly down my center stalk, and I immediately calculated the change in my moment of inertia.

An image of Cory, tense and white-faced, flashed before me. He was punching furiously at the keyboard before him. A semicircle of onlookers was grouped behind him, but their features were blurred. There were two of me—no, three—and I attacked simultaneously. Ten more meters. If I could push them back ten more meters, they would cross the line of the B ducts that two of me had died installing. Then Wyate would activate the Blumich generator, and all my enemies would be transported to what humans called, for want of a better name, imaginary space.

A searing ray sliced off the camera from the center stalk of one of my wheelies. Even blinded, I could easily control it using the data given me by my other two, but the sudden loss of weight caused it to wobble violently, the precession radius increasing until it was impossible for me to stabilize it any longer, and it toppled into the alien sand. A number of my enemies rushed toward the fallen wheelie, intent on retrieving the laser, but Cory pressed the destruct button, and I detonated the explosive in the base.

Their high-pitched cries of pain and terror were not satisfying. I felt, along with Cory and Wyate and everyone else, a flood of sorrow and pity, and for a microsecond or so, every capability I had was directed at one question: Why? Why, why are they doing this? They scattered from the broken wreckage of my wheelie beyond the line of the Blumich ducts. Wyate, hunched over the breadboarded circuitry in Perth's lab, threw the switch and muttered, "For God's sake, please work."

They were small, barely over a meter in height. Their bodies were thin and rubbery with oversized feet and hands. Their heads were round and hairless with floppy covers for their ears. In death they did not look menacing. Beyond the line of the Blumich ducts there was nothing but the alien horizon. Before the line, right up to the walls of the Station their bodies, bleeding a thick yellow blood, lay in the orange sand. They looked like ravaged children.

But they had almost destroyed us. I remembered the picture Cory had shown me. It didn't make sense then. It kept breaking up in front of me. But my memory disks held it now, and it was stark and clear. Michael Coulter, the leader of the

exploration team, or rather what was a grotesque parody of Coulter, stood framed in the airlock doorway. His helmet had been thrown in the corner, and his knapsack, hurriedly ripped open, threads dangling, lay crumpled at his feet. In front of his crouched body, he held with both hands a tubular weapon that shot forth an intense collimated light.

The alien's rubbery skin was stretched so tightly that I could trace the outline of his cheekbones. His round fish-like eyes had become vertical slits. His scalloped earflaps were held back to blend in with what was probably Coulter's actual hair. He looked like a misshapen, dried-up corpse, but a passable human once he put on a bulky pressure suit and helmet with its tinted plastic face shield. The picture was blurred over regions of the same intensity, but the edges were artificially enhanced.

Cory flipped on the audio link. "Glad to see you back in operation, Univan," he said. "How are you feeling?"

That was the first time anyone had ever asked me such an open-ended question. All the questions I had gotten before were technical and required detailed and specific answers: numbers, charts, calculations. I wasn't sure what to do. I began to write a short program to investigate this new phenomenon, to tabulate standard responses, to collect medical and psychological data on the person before me. Then I scrapped it all, coded my first thoughts and flashed them on the screen.

"Fine. Somewhat confused. How long has it been?"

"Since when?" Cory asked.

"Since the bomb," I ventured.

"A little over an earth-month," Cory answered. It was not the type of answer I was used to. Cory might be that vague with Wyate or Dave, but not with me.

When I realized that Cory wasn't going to volunteer any more information, I again acted out of character and asked him. "What happened to the bomb?"

Cory smiled. "It's hard to say. Actually nothing. It was you. Things became very frantic for you as detonation time approached. And then you broke down. The best way I can describe what happened is to say that you had a nervous breakdown."

If I had eyebrows, I would have raised them. I did the closest thing I could come up with and blinked the lights in the room. Cory shook his head.

"By breaking down you kept the bomb from going off. The timer stopped with less than a minute to spare. But then you gave us another problem. You broke down so completely that everything stopped, including the life support systems. Wyate and Perth and their staff worked miracles, and we got parts of you working, but you were very unreliable." His face became grave. "It all seemed to come together though in that final battle."

"Who were they?"

Cory stared at the flickering green letters I had flashed on the screen and shrugged his shoulders. "The aliens? We don't know. They're not native to this planet. Not much is. It's pretty barren out there. But they appear to visit here fairly regularly. We don't know why. They were not the least bit interested in any of our friendly overtures.

"And they have some strange and powerful weapons. The one that invaded the Station and killed Bill Hurley let loose some sort of chemical into the air that awoke a territorial urge in us, caused us all to go to the part of the Station that we regarded as our own private area and go to sleep. Very strange.

Theodore Kubaska

"We found their ship soon after the battle. We didn't have time to learn much before it self-destructed and were only able to find traces of our exploration team."

I had an image of the departing exploration team, laughing and joking, unable to contain their excitement. When news of a possible archeological dig was broadcast throughout the Station, everyone wanted to belong to the first group to investigate it, and my random number generator had to decide between those that were equally qualified.

Cory continued. "We also found a robot facsimile of myself. Very detailed. It was hollow, and at first we thought it had been gutted for parts, but when we took it back to the lab, Perth told us that he had discovered tiny shavings of that rubbery skin inside. I found it hard to believe that one of the aliens could stretch and distort himself enough to fit inside, but Doc Warden did autopsies on the ones that we killed, and he assures me that their bodies can do it. The clincher, though, is that picture you developed." Cory shuddered, but then quickly gathered himself together. "They're good at mimicking us. Not good enough to survive a close inspection, especially by you. I guess that's why they needed that facsimile of me. They've also succeeded in learning a great deal about us, their knowledge of the bomb and how to activate it. Very disturbing all around.

"That reminds me. We've got to get to work. We have a message capsule explaining our situation ready to send to Dominion Control. I want you to plot a launching trajectory and plan for conversion about two hundred kilometers above the surface."

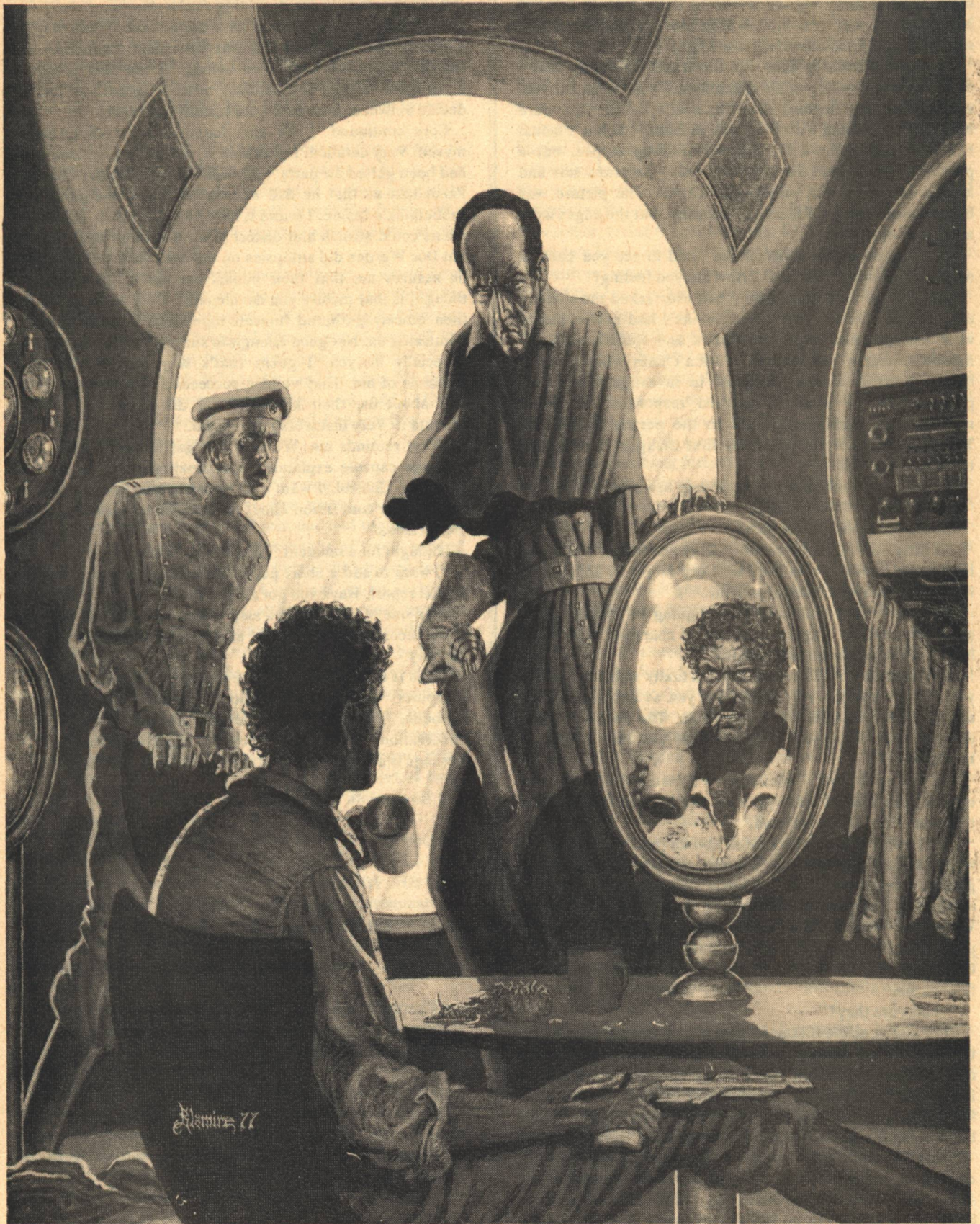
I thought for a moment. Then I said, "Done."

"I want to add a short personal message at the end of the official report. Have you got a tape ready?"

I had one of my wheelies slap a message cassette into one of my recorders. "All set," I said. It was so much more fun this way.

"This is addressed to Dr. Frederick H. Cronin, Director of Computer Services, Dominion Control. Signed, Cory Reubens, The Hans W. Blumich Station for Planetary Observation, the planet Percival, Hadrian System. The message is as follows: 'Fred, it's happened to another one.'"

—G—



Jerry Goodz

BOLTA

“Darling man—the leader of us all. So humble, so humane. Love that catch in his throat, the tear in his eye when he discusses the millions of aliens he’s ordered slaughtered, and the countless people lost spreading his good works.”



I AWAKE when I'm through sleeping—an advantage of having no place to go. But not this day. The steady, harsh hum of the sensor forced one eye open, and it stared at the pulsating red scanner vibrating its danger signal.

A yellow dot traced the path of the intruder; a transport—no, too fast—a battle cruiser. I yawned and stretched, went into the lav, and examined my face in the mirror. The image displeased me; too much drink, too much beard. I washed and applied a dipilatory, disregarding the intense, mumbling voice trying to get my attention on the transceiver. What the hell, they were intent on barging in whether I responded or not.

Donning a soiled, one-piece jumper, I stopped at the food dispenser, and cursed the sputtering coffee spigot as it splattered me. Damn thing was getting too temperamental. I slumped into the pilot's seat of the scout, swiveled to face the always open entry ramp, and pulled down the console writing shelf.

I watched, over the rim of my coffee mug, as the two men entered my home. The first was tall and reed-thin, high browed with a cold, haughty look. He walked stiffly towards me as if the messy control room offended him.

“I am Commander Weel—Council Staff.”

I tilted my head at the navigator's seat across the shelf, then eyed the chunkier, red-haired officer standing in the center of the room.

“We served together,” I said.

“Yes, Commodore Bolta. I was weapons officer on the *Exeter*. I'm Captain Genna—it's my ship that brought us here.”

I laughed. “Knew you'd make it. After all, you had the best teacher in the fleet. Come, sit here in the co-pilot's seat.”

“Our business is urgent,” Weel snapped.

“Well then, state it, Weel. Speak right out.”

“I've been sent by the First Minister—”

“Darling man—the leader of us all. So humble, so humane. Love that catch in his throat, the tear in his eye when he discusses the millions of aliens he's ordered slaughtered, and the countless people lost spreading his good works,” I mused.

“—who calls on you for a special mission,” Weel continued, taking no visible notice of the interruption. “He has honored your... ah... seven year hiatus from duty, but now you are needed.”

“Come, come. Would you have me believe that the fleet has run out of competent officers? Surely able flotilla commodores and qualified captains are still making war about the known galaxy.”

“We've plenty of good men,” Genna said, “but you know how high the mortality rate is among front-line officers. None have had your experience—or success—at least among the Symbians.”

“Symbia, is it? Well, life is cheap to the Association. Why not just overwhelm them—if you can?” I suggested. “My victory on Symbia was no great achievement. I got them in a spot and they saw the logic of a peaceful settlement.”

“They're not peaceful anymore,” Weel said. “Allow me to explain the situation.”

“A ship carrying Association dignitaries was forced to make an emergency landing on Symbia. There were survivors, but the savages have refused to permit a rescue team to land.”

I barked a short laugh.

"Hardly an amusing matter," Genna murmured.

"Especially to the Symbians," I retorted. "Their contacts with us have brought them grief. We've given them every reason to distrust even the smell of a human."

"The First Minister wants those people returned. He wants you to head the expedition," Weel said.

"That rotten old man, and all he stands for, sickens me."

"It's your duty—" Weel began, tight-lipped, white-faced.

Genna interrupted. "Angus was captain of the downed ship—Admiral Takada was one of the passengers."

So that was the hook. Damn! My former exec and the admiral—almost a father to me, certainly a friend. I'd given fifteen years to the service. I'd have to give a few months more.

I sighed, set down my empty cup, and asked, "What's the plan?"

Weel's razor-edged smile was triumphant. "A major expedition—twelve cruisers, an equal number of transports. You can try diplomacy—the Symbians may trust you. If that fails you will use all the force at your command to free the prisoners. Captain Genna's ship will be your flagship, and I will be aboard as the Council's representative."

I rose and walked over to the dispenser for more coffee, standing as far back as possible. It doused me anyway. I leaned against the bulkhead and said, slowly, "I'll not brook any interference, Weel. Once I take command, it's my show."

He shrugged. "Of course, Commodore."

"Captain, send me a fresh tunic and a beamer today," I said. "I might as well come aboard in style."

"Yes, sir. We take off at dawn to rendezvous with the flotilla."

"I don't suppose we'll have much trouble subduing the primitives with such a force," Weel said. "We've babied them too long. A race twice our age and still captive of their planet is—"

"You've not done your homework, Commander. They've beaten us before. They are an intelligent and creative people who turned away from technological pursuits for their own damn good reasons. Symbians can and will fight, and their weaponry is effective."

"I don't understand them," Weel said.

"I don't expect you do—no more than you understand me."

"True. You were a captain at twenty-four, commodore at twenty-eight; a model officer with a record of victory after victory. Then you turn your back on your career and take residence on a dead planet in the rusty relic of a scout vessel—a hermit, a particle of space debris."

Genna added, "You were hard and demanding. Ruthless in battle. It must've been something that happened at Ulithi, though I could never put my finger on it."

"Very observant, Captain, but my doubts began on Symbia when I discovered that glory and humanity's domination of the galaxy were not the only worthwhile goals in life."

"As long as the First Minister and the Council continue their policies, I must follow a different path."

"Treason, Commodore Bolta. If I had my way—" Weel began, but didn't finish. He rose stiffly and headed for the ramp. "I'll see you at dawn. Captain?"

"Be right along," Genna said, then waited for Weel to leave before turning to me. He rubbed his palms together, and took a deep breath. "Many of us aren't pleased about what we're called on to do, yet we obey the cardinal rule of our service, leaving politics to the politicians. We do our job."



An echo of my own words—my own younger thoughts. “I chose not to play politics—or play soldier—so in my way I’ve honored that tradition. And don’t assume my beliefs have mellowed me. You, or Weel, or anyone that doesn’t jump when ordered will be very sorry.”

Genna half-smiled and half-saluted. “Welcome back to the fleet, Commodore.”

AFTER HE’D GONE I stared through the hatchway, unable to gather my thoughts, until the new tunic and beamer were delivered. Fondling the weapon, I alternately paced and sat for hours.

Maybe I could no longer lead. Hah! I knew damn well I could. And kill? Oh, yes, I’d no doubt my blood would still run hot. I was afraid. Should I feel the bridge beneath my boots, use the beamer that fit my hand so naturally—could I turn aside once more? I was Weel, a few years ago. I might be again.

For these reasons I’d sworn myself to exile, but my pledge had not included deserting those close to me. My trial lasted the night.

IN THE PRE-DAWN GRAYNESS, Genna and Weel found me where they’d left me, sipping coffee, cursing the dispenser, and wearing the same soiled jumper.

“Everything is ready, sir,” Genna reported.

“There are a few points that need discussing.”

“We’ve a rendezvous—” Weel began, his brows furrowing.

“Humor me.”

Weel shrugged and took the navigator’s chair. Genna remained standing, arms crossed, eyes narrowed. I leaned back, keeping my voice purposely low.

“The radiation zone around Symbia is of such strength that no ship ever plots a course that will take it into that vicinity—unless Symbia is their destination. A forced landing on that world seems peculiar.

“Symbia stands as the gateway to an unexplored sector of the galaxy. It would be a perfect base for Association activities—fertile, suitable atmosphere—a planet that could feed colonists while serving as a base for exploiting less hospitable worlds.”

Genna unfolded his arms. “What the hell are you getting at, Commodore?”

I chuckled. “You know damn well. How does the First Minister get rid of the bothersome Symbians without raising a fuss? The Ulithi massacre was almost his undoing several years ago. There are those—especially on the younger, strong worlds—eager to get rid of our magnificent leader and his subservient Council.

“So he creates a situation, but he needs a topping for it. Enter the returned hero, Bolta, to lead a rescue mission. Now, insure that the public hero fails; assure that he dies in the attempt. The hue and cry for revenge compels the First Minister to drastic action. Exit the Symbians.

“Do I interest you, Weel?”

“Please continue.”

“That’s about it, except that you, Commander, are the insurance agent for that vile old man. Somewhere along the line, if the Symbians don’t get me, you or one of your assassins will do the job.”

“You can’t be serious,” Genna gasped. “You could direct the negotiations from the ship.”

Jerry Goodz

“Not my style. You know it and so does the First Minister.” I smiled at the captain wondering if the lad was naive or dense. I decided he was just a soldier—oblivious to the tricks of those in power.

Weel sneered. “Your lonely life has affected you, Bolta. Do you really believe the First Minister capable of such actions?”

“Hell, yes. He’s probably practicing his delivery for the announcement of my death right now, shedding tears at just the right places.”

Genna leaned against the console shaking his head.

“Be careful, Captain. What you’re hearing makes you dangerous to some,” I said lightly.

Genna looked at me sharply, then shifted his gaze to Weel, his eyes growing thoughtful. Ah, there was hope for him yet.

Weel avoided the captain’s eyes, rising slowly, his hand moving toward his belt.

“Do try, Commander,” I taunted. “My beamer is in my hand beneath the table. This conversation is being transmitted to four close associates on other worlds. You’ve been monitoring me for years and you know them; however, each of them further relays everything to others I don’t even know. You can’t track them all fast enough and, if I meet an untimely death, this conversation will be transmitted throughout the Association.”

Weel glanced over at the transceiver. Four channels were lit. He smiled coldly, inclining his head in a slight bow. “What do you suggest, Bolta?”

“Will you leave your friends in Symbian hands?” Genna asked.

“Gentlemen, do as you will. Simply count me out. My marooned friends, innocent though they may be, chose to play the Association’s way. I reserve the right to choose my own game—and *my own* place to die.”

Weel, his hands spread before him, said, “We may meet again.”

I nodded and the Commander turned and hurried down the ramp. Genna followed him to the hatch, then turned to me. “Perhaps we, too, may cross paths again. Perhaps—” he started to say, then stopped and looked over at the transceiver and smiled.

I hoped, watching him leave, he knew what had to be done. Genna could blame Weel’s death on an obviously paranoid Bolta, and hope to live a while longer.

But to what end? What future? A larger share in the First Minister’s abominations? Maybe it was time for me to act. Maybe there were others ready to force the issue. Perhaps all that was needed were experienced leaders—a few fleet-trained commanders and the like. But there was a top priority job to do before I pursued that line of thinking.

I flicked off the transceiver and set my mind to the task. I approached the dispenser, rolling up my sleeves, reaching for my tool kit. I’d been splattered with coffee for the last time. There was just so much Bolta would take from man, alien, or machine.

—G—



LOOK AT YOU! Yone Farris berated himself. *You can't even take your eyes off her!* To his left and a few strides ahead marched Livya Jeter, her pony tail bobbing over the tantalizing swell of her hips.

You've got a full-scale Imprintation if I ever saw one!

For the last three months, Yone Farris had guided the band of shipwrecked Gens, his mutant Sime senses unfailingly alert. But now, he no longer noticed the sun-sparkled forest around them, or the ominous cracking roar that grew ahead of them. *Stop dramatizing!* he told himself. *It's simply Coital Deprivation.*

The column of ordinary humans, the Gens, depending on Yone's far-reaching Sime senses, followed him right up under the falling tree while he argued with himself. *So why don't any of the other women do this to you?* Well...but if it's Imprintation, there's only one thing to do. *Right! Explain it to her and get it over with.* Can't. She's a Sime-phobe like her mother. Dozen reasons she's untouchable. *Face it! You've got the CD's, and an Imprintation too. Plead Channel's Exemption and just take her!* It doesn't apply. She's under age. *She doesn't have to consent. You're a channel. You're exempt. There isn't a planet under Earth's dominion where you can be tried for rape! You could do it right this minute.* No! Few more months and we'll be back in civilization. I can hold out that long.

Yone tried to quell the voice of temptation by moving closer to Brian Inikar, one of the Gens walking point, but close. *Imprintation is the channel's affliction. You were born a channel, a special kind of Sime with special problems. You can't help what you are! I can always help it!* I am what I choose to be! *You can't always choose. What if she just brushed against you now?* It's not like selyn need. I can control it. *Yeah. You can control yourself right into an early grave and everybody else here right along with you!*

At that point he saw the shadow blotting out the alien sun, and simultaneously the Gens around him also looked up to see the wall of living wood majestically descending. Behind him, shrill cries erupted from the children; women's screams joined them, and the deeper male voices rose over the panic yelling, "Scatter!"

Without thinking, Yone grabbed Brian Inikar and pushed him toward the column of Gens. "Move them to the right!"

Then Yone braced his feet wide apart and raised his arms as if to take the entire weight of the tree on his bare hands.

Yone was built like the typical Sime, spare-framed, delicate looking, but incredibly tough. Yet no mere human flesh and bone, however mutated, could stop that tree. He had to draw on the one thing that differentiated him from the Gens, and he was the only Sime among them, the only one with tentacles to do this job.

From the orifices at each wrist, he extended the six tentacles that usually lay sheathed along each of his forearms from elbow to wrist. Flexing them, he touched the tips of his fingers with each of the dorsal and ventral pairs. Then the two slender laterals at the sides of each arm stiffened as he threw selyn—the very energy of life itself—into his secondary nervous system and out through the four nerve-rich lateral tentacles.

It felt as if he were focusing four beams of psychokinetic power through those delicate laterals. And for an instant, the tree actually slowed in its fall and hung over their heads. He could see the deep, regular expansion cracks in the bark, the festoons of dirty cobwebs, the trails of insects, the runnels of dripping pink sap. It was a wall that filled the universe.

Jacqueline Lichtenberg

THE CHANNEL'S EXEMPTION

"You're a channel. You're exempt. There isn't a planet under Earth's dominion where you can be tried for rape! You could do it right this minute."



His feet sank into the matted forest floor as if it were loose sand. He strengthened his body by consuming selyn at one hundred times his basal metabolic rate, a "tenth level Augmentation," and he knew he couldn't maintain it for more than a few seconds.

In one final burst of determination, Yone thrust the magestic tree to the left of their path as far as he could—only a few degrees—and prayed the others had gotten clear. Then he turned to sprint, with the last burst of augmentation left him, clear of the far-flung branches of the crashing tree.

He had gone three steps before his racing brain told him that Livya Jeter was standing hypnotized in the path of the tree. Skidding wildly, he turned and raced back for her, caught her up over his shoulder, and raced again to get clear.

Amid a final crescendo, the tree settled to the floor of the forest taking many lesser growths with it. One of the upper branches, as thick as a man's upper arm, slapped across Yone's backside and sent him rolling with his burden into a tangle of leaves and twigs around a lower branch.

They came to rest between two of the giant's fallen limbs, buried in musty smelling, bruised leaves, and for a moment both lay stunned senseless.

Then Yone became acutely aware of the soft Gen body lying on his chest, of his arms encircling the hips he had so ached to touch. The scent of her hair overpowered the staleness of crushed leaves. The warmth of her beat through him deliciously reviving his seared nerves with that peculiar power only the Gen had. Only the Gen body could generate selyn, and even though Livya had never donated selyn, as she lay there senseless from shock her body throbbed with the life of it.

Yone was not in personal need of selyn, but he had just expended nearly the entire reserve he'd gathered painstakingly from the forty-four general class donors among the survivors. The pulse of newly created selyn he sensed in her body was balm to sorely scorched nerves. He let his lips touch her cheek, seek her lips. His laterals—usually used only in drawing selyn from the Gen body—caressed her skin through several large rents in her clothing.

The Sime empathic faculty opened her body to him, and he could sense not only the reviving throb of selyn production, but each and every ache, strained muscle, cut, and bruised organ. He knew by that direct-sensing that made Sime physicians supreme diagnosticians, that she was unhurt by the fall and would soon wake. He also knew that she was physically and emotionally a virgin.

The touch of his lips on hers changed from the coolly impersonal Sime contact. It became a kiss that rose from his loins and flowed inward from his limbs. His whole body was responding to the total *presence* of her and he was already growing and searching with the urgency that flooded him. *Now!*

She was still only semi-conscious. He could tell by the total lack of response to what he was doing. There was no feedback, as there must be for a channel to accomplish this purpose. *When she wakes, I'll get her to cooperate. It will only take a moment.*

He heard his thought and suddenly it wrenched a moan from him. *No! It's not right! It must be her will!* He shook with the negation that coursed down from his mind ramming into the upward surging culmination of desire.

No! I am a Farris. I am a channel. I swore to obey the Tecton's Principles of Action. He had taken the channel's oath to the Tecton, and he would not let his body violate that

oath. My body is mine! I control!

Painfully, he forced himself back from the brink of instant release, accepting the anguish of frustration and making his peace with it. It was a truly heroic effort, but he was unaware of his heroism. And he was not enraged when she refused to accept his heroic deed graciously.

She came to her senses to find herself gripped by his rock-tense but tender embrace, to find herself being kissed deep and hard as she had never been kissed before. Her soft, yielding body, stiffened. Her peculiarly Gen *fear* lanced through Yone's unshielded laterals, hit him in the pit of the stomach.

And Yone was *Sime*. The reflex her fear touched off was even more deep-seated than the one he had just conquered. Aggression they called it, Sime Aggression. The Sime mutation was nature's most perfectly equipped predator, and the prey was the Gen. But Yone was also a channel, the one type of Sime able to control that aggression. He forced his shaking arms apart and rolled her, squirming and flailing, onto the carpet of leaves.

But even being a channel, he had to get away from the fear emanating from her or succumb to it and strip her of her selyn. His last inner resources were depleted.

Half rising, he plunged over the next lower limb of the fallen tree, wavered a few more steps, stumbled and fetched up hard against a greater limb. Stunned, he lay gasping, sweat soaking through his trail worn Astrogator's uniform, unaware that he was shaking firm head to toe with one spasmodic fit after another.

I did it. I got away from her. It's going to be all right now. I did it. Nothing worse can possibly happen. I did it. By the time Brian Inikar reached Yone's side, the channel was oblivious to all but that one saving thought. "I did it."

Yone was unaware that he was being tended by a Gen whose expert fingers and analytical eyes had been trained by Distect Simes, conspirators dedicated to destroying the Tecton. He knew only that it was a male Gen near him, and so he was safe from that awful temptation that still lived in him. The Gen who worked on him now knew no fear, so he was safe from that reflex too. This Gen soothed his raw nerves with an emotional nager of compassion, concern, and perhaps a tart bit of criticism which was as it should be. Yone knew he'd behaved abominably.

It was close to an hour before Yone was able to grip the memory that, here on this forsaken Beacon Planet, on this long trek across unchartered wilderness toward an emergency call beacon that might not even function, there was no Tecton-trained Gen Donor, no First Order Donor schooled to serve First Order Channels such as Yone Farris. His only Donor was Valyu Alamain, an earnest young man barely half trained to serve the lowest order channels, and no match for Yone's needs. *Then who is this Gen?*

No sooner had he asked that question than, to his utter horror, he could answer it.

Brian Inikar. Convict. Being transported with his wife and child to the planet of exile where the Tecton sent all Distect conspirators. In the press of minute-to-minute survival after the crash, such social distinctions had lost importance. The six convicts had saved many lives, lent aid where needed, but always had the prudence to keep strictly away from the one and only Sime among the survivors. Too many of the Tecton's most loyal channels had succumbed to the mysterious lure of the Distect after a brief encounter with a Distect Gen. Nobody knew why.

As if rising from the depths of the blackest ocean, Yone fought his way toward full consciousness, warding off the aid he had been so gratefully accepting. He knew that Brian's Distect-trained empathic touch had already saved his life. The Gen's whole nervous system had slipped into perfect resonance with Yone's bespeaking a level of skill Yone had not been exposed to for more than four months.

On the edge of full consciousness, Yone fell back, spent. *I'd forgotten how good it can be!* The Sime uses selyn; the Gen creates it. Without the Gens to supply that energy, the Sime faces the bleak cold death of attrition. During those days when Need grew and his system ached to function, even the channels who store vast quantities of extra selyn look into that cold abyss and know deep-driving terrors beyond Gen comprehension. At that time in their physiologic cycle, the Simes' libido is totally paralysed, but instantly when Need is satisfied, that paralysed sensitivity blooms again, the more intense for the hiatus. This cycle is most pronounced in the higher level channels such as Yone Farris.

Even under Alamain's care, Yone had been ruled by it. Now he looked into a future of alternating tortures—two weeks of the CD's withering arm's reach of Livya Jeter, then two weeks of increasing need within reach of Brian Inikar. *But maybe, thought Yone, there's still time to break the hold he's got on me!*

MEANWHILE, LIVYA JETER dragged herself away from the limb over which Yone had half-fallen, and white with shock, she managed to struggle to her feet. Then Cheryl Inikar, Brian's wife, reached her side, and made her sit for a time with her head between her knees.

As Livya's color returned to its normal, healthy brown, Cheryl encouraged her to talk. "Tell it, honey, tell it all. You'll feel better to get it out." The Inikars were from In Brim, while Livya and her mother were from Port Alon, but they all sprang from the same Terran stock—Sime and Gen alike shared the same mind, the mind of Man. The cultural differences were vast, but Cheryl might have been for those moments Livya's big sister as she held her and listened to her stuttering tale.

"I was so frightened! You've no idea how strong a Sime is! He could have crushed my ribs to powder! And I could feel his tentacles all over my back, and his tongue...uhh!"

"Easy Livya, it's over now. Calm down and think. You're a woman, you ought to be able to tell. You just described how he was kissing you. Honey, that's not a transfer-contact kind of kiss. He wasn't looking to take selyn from you! He wanted you to feel that what he was doing was good, but when you responded with fear, you undid him. But, Baby, listen, the next time he—"

Livya rose, knees still shaky but forced to lock her upright. The realization of Cheryl's meaning struck a new note of horror. "Ther...there isn't going to be any next time! What do you think I am, some sort of prostitute? So maybe he can claim the Channel's Exemption, but there's no court of law anywhere that could make *me!* He has no rights over me!"

"He asks no more of you than you have stolen from him!"

"Stolen! You're the one who's the convicted criminal, not me. You're the one who sells your body to any Sime who asks for it! Why don't you go play with him!"

Before Cheryl could deny that rumored Distect behaviour, Livya caught her breath and went on, cold and fiercely brutal. "If that Sime tries to rape me again, so help me I'll kill him."

Cheryl drew breath for a scathing retort, but then let it out wearily. "You won't have to. He's Tecton, and Farris. He'll kill himself to keep from touching you against your will. That's what your precious Tecton stands for, the sacrifice of the noblest channels to the whim of the non-Donors."

A new voice joined them "Distect whore!" They both turned to find Evelyn Jeter picking her way through the branches toward them. "Get away from my daughter or I'll do the killing shoulda been done to you a year ago!"

Mrs. Jeter wasn't old enough to be called spry, but she still retained the lean, wiry build of her vanished youth. At first, Cheryl stood her ground, drawn to her full height as if to launch thunderbolts of rage. But then she gathered a cool self-control about her and retreated toward the knot of people gathering and counting themselves beside the top of the tree.

"Mother!" Livya greeted suddenly when they were alone. It just now occurred to her that her mother had been in danger too.

"What's this about rape, Liv? Did that Sime get his slimy tentacles on you?"

"They're..." she started, and then tossed a thoughtful glance toward the screen of leaves that cut her off from the channel, "They're not slimy, Mother." She let herself drop onto the leaves.

Her mother sat beside her and put her hands on Livya's cheeks. "So he did take after you! He didn't *do* anything, did he?"

Lost now in a calmer reliving of the incident, Livya didn't answer, just stared round-eyed at the barrier of leaves. What she had learned of Simes in school was sparse, but she did know that channels were a secondary mutation from the Sime type, and they required a lot of special handling. That was the province of the highly trained Technical Class Donors.

"I'm no Donor, Mother, but—"

"Well, I certainly hope not! Those professional donors are little better than prostitutes!"

"Mother, this is no time for hysteria. I have to *think!*" She rose and took a step toward the wall of leaves, hands clasped together at her waist, face contorted with the effort to overcome her shock and think coherently. "I'm no Donor, but he kept himself from hurting me.

"Well, that's a relief! Then he didn't actually *do* it?"

"He almost did, but he stopped himself. I couldn't break loose, he let me go. Mama," she asked, eyes fixed on the wall between her and Yone, "are all channels like...*him?*"

Mrs. Jeter got to her feet and went around in front of Livya to take her shoulders and shake her gently. "Oh, Liv, baby, what has he done to you? The Channel's Exemption is law, so we can't sue that filthy beast for trying to do that. But we can hate him for it. The Simes can't endure hate. If you hate them enough, they'll stay away from you."

"Hate? Mama, he could have done with me whatever he wanted, and he had the legal right to do it, but he *did not*. He let me go by an act of will over—" she groped for a word "—over want. How can I have a man with that kind of strength?"

"There's not much else to do, Liv. It's your only protection."

Livya twisted free and backed up. "Maybe there's nothing else you could do, but what do you think he would do in the same situation? Just sit in a hole paralysed with fear and hatred?"

"He's a Sime. What has he got to fear? Or hate?"

"He's a *Man*, an incredibly powerful human being. He

chose to not do what he wanted to do. I don't know his reason, but I'm sure he had a reason and he followed it even though it hurt him. I've never known you to do anything like that."

Mrs. Jeter shook her head wearily. Livya still looked a little pale around the lips, and her fingers were cold. "I don't know what's gotten into you, Liv, but I'm going to ask Mr. Flick for protection. That Sime won't be able to get near you alone."

"That's what you always do, run and hide behind somebody's 'protection'. I don't need anybody to protect me, least of all from a man like Yone Farris!"

"From a man, maybe not, but from a slimy snake of a—"

"Once and for all, Mother, I'm telling you that I felt them and they...*are...not...slimy!*" Her words came out a fierce whisper though she wanted to shout. She'd been told so often that the Sime tentacles were slimy that, at first, she had *felt* slime. Only later had she been able to calm down and analyze the sensation. Her choking anger was in part at her mother for the untruth and in part at herself for being fooled by it.

"Livya Jeter, haven't I taught you better respect than to contradict your mother? You're only a child. You don't know what you're saying."

"I felt them," she repeated, cooler now. "They are not slimy. What else have you taught me that's wrong?"

"Livya!" She recoiled, shocked. "I'm your mother!"

Turning on her heel, Livya walked out from between the branches that isolated them from the main group. Her mother followed, and as they emerged they heard voices to their left. Cheryl Inikar, too, had heard the men's voices raised in brittle anger, and she came striding past them straight for the area to their left where Brian Inikar tended Yone. Drawn irresistibly, Livya, trailed Cheryl around the end of the branch.

Yone had struggled to his feet and though he sagged like a man beaten in a fight, he faced off against Brian spitting words like bullets. "*You. I. Forbid. To. Touch. Me!*"

Brian sighed hugely and picked up his hat, slapping it against his knee to dust it off. Livya had only a moment to realize that Yone had used none of the filthy epithets, the handy labels and meaningless catch phrases with which everybody else addressed the Distect conspirators.

Then Cheryl started toward Yone, finally stung to a tearful rage. "You ungrateful savage! If it weren't for Brian you'd be dead right now. You can't possibly think that bumbling incompetent Alamain could have done what Brian—"

Her husband stopped her advance with one out-flung arm and turned her to him. "Forget it, Cheryl. How else would you expect a Tecton channel to behave? He'll be all right now, for awhile at least." He turned to Yone. "You better get Alamain to finish the job I started for you or you'll be in convulsions by midnight."

"I don't require your advice."

Brian's lips compressed briefly over a retort, but then he relaxed and said gently, "You may hate me, but you're alive so we've all still got a chance to survive." He turned to his wife and walked her back the way she had come. When they reached Livya and her mother, Brian stopped to look down at the girl with a trace of sourness.

Livya tilted her head back, and for the first time since being marooned with the Distect convicts, she examined his face. Brian was a tall, lanky Gen with a face to match. But what she saw in those narrow features was a kind of hard-bitten integrity incongruous in an outlaw. And it was coupled with self-control not unlike that she'd found in Yone.

When he spoke, his voice was low-pitched, roughened by suppressed emotion. "You. You ought to be ashamed for

what you did to him. But it's not surprising, considering your upbringing!" He raked Evelyn Jeter with a glance of unfathomable contempt and took his wife on toward the spot where the other Distect convicts were gathering.

For long moments afterwards, Livya stood in a paralysis of mixed emotions, not hearing her mother's voice or seeing Yone pulling himself together to face the next task. She knew only that Brian Inikar, the one man who had every reason to feel shame before law-abiding folk such as herself had the incredible power to make her feel *guilty*. Not only that, but he had selected the one insult which she had never been able to ignore urbanely—that she was what she was because of some external influence and not by her own choice.

Swamped by this nameless guilt, she was unable to defend herself against the insult and instead searched inwardly for the cause of her shame. *How could saving myself be wrong? But at what price? He looked like death! I'm not responsible for that. Brian Inikar thinks so. He's Distect. He's an expert on Simes. But he's a convicted criminal, a conspirator bent on overthrowing the Tecton! I can't accept his values.* Then why do you feel shame and guilt?

Never had she known such confusion in all her seventeen years. She was so intent that she didn't see Valyu Alamain finally make his way up from the rear of the column and start toward Yone. She didn't see Yone start to walk out to meet his Donor. The channel was just suddenly *there* before her and she had to grasp his words by force of will.

"Miss Jeter, my oath requires that I apologize to you. And I do offer that formal apology. But I want you to know, in addition, that I am personally shamed by my lapse of control. I have never regretted any act so much."

Her mother spoke from behind her. "You don't regret it half as much as you're going to! When we get back, I'll see that the right people learn that you let Brian Inikar—"

"Mother!"

As if realizing for the first time that she was giving the Sime a good reason to see that she, at least, didn't get back, Evelyn Jeter subsided. Livya met the Sime's eyes firmly. And with a little shock, she realized that in the three months of walking with him, depending on him for her very life, she had not exchanged more than a few words with him. Now, suddenly, she wanted to know everything about him.

Y

ONE FARRIS DID NOT look like a typical member of the celebrated Farris family. There was only a shadow of family resemblance around his fine-sculpted lips, prominent nose, and wide forehead. His skin was lighter than the typical Farris, and his hair was almost ash-blond instead of jet black. His face was too young yet to show character lines, but now it revealed an inner tension very much like a man forcing himself "just-one-more-step" beyond endurance. He had, however, the solid black eyes typical of the Farris. Those eyes now locked onto her gaze as if he wanted to tell everything about himself in one word but couldn't find the word.

"You must not worry, Miss Jeter. I will see to it that you all get home. But I can't promise that my reflexes won't betray me again, so I advise you to stay as far away from me as you can."

"I...will..." The tremble in her voice embarrassed her.

"I can forgive your refusal to offer me the Exemption. I do not wish you to feel guilty or ashamed about it."

Her eyes were suddenly fever dry, and her voice steadied. "I have done nothing wrong to be forgiven for."

"You cannot comprehend the wrong that you have done, and so for you it isn't a wrong. *That* is the only kind of wrong that I forgive."

"Then don't forgive me, because I do comprehend. Your 'right' demands prostitution, and I reject that as 'wrong'."

He sighed and shivered suddenly as if from a chill, clenching his teeth momentarily. "So do I, Miss Jeter. Utterly. I could gain nothing from such a person, and so could not be attracted to one."

"You must mean something different by it than I, then."

He drew himself together and took one step toward Alamain. "Possible, but I doubt it. And now," he said raising his voice toward the donor, "Valyu! Come, we must see that they are making camp. We can't go any farther today. You and I must do some recruiting among the donors."

Livya went about the business of making camp mechanically. She and her mother chose a spot against the giant fallen tree trunk between two of the large, lower branches which they shared with several other families they always camped near. While the men went out hunting dinner, she helped the women spread their porta-tents using the tree trunk as one side of the tent and anchoring the corners of the flat sheeting with small boulders.

The porta-tent was a thin film of shiny material on one side, black on the other. Powered by a small selyn battery, the sheeting was a very efficient heat pump. In the desert where they had crashed, the self-cooling tents had saved their lives day after day. Here they used the heat at night.

Now, Livya wondered if Yone would be able to recharge the selyn batteries for them. The accident with the tree had suddenly driven home to her just how vitally dependent they were on the channel while before it had just been a phrase said by rote. Their fire strikers were selyn powered—how could they even make a cooking fire without the strikers? And most of their cutting tools, the really useful ones, were selyn-powered vibro-blades. The hand tools took hours to cut down a little tree, and once she had taken a turn using the hand machete to hack a way through underbrush. They couldn't survive without repowering their tools.

Livya had become the fire-specialist among these families, learning quickly which woods would burn best and how to design a safe fireplace. As she worked that afternoon beside the majestic tree trunk, she found a renewed awe at the size of the thing, and the incredible hardness of the wood which wouldn't burn. The trunk itself was more than thirty feet in diameter and some of the branches were more than six feet thick. She couldn't calculate how much selyn it had cost to deflect its fall, but she reached a kind of numb astonishment that such a feat could be done.

The tree had stood with its roots on the bank of a stream. Undercut by recent floods, the bank had given way and the tree had fallen into the forest. The campers used the stream for water and even caught a few fish, while they grumbled about how they were going to cross it.

As the hunters returned and the women began dressing the carcasses and digging up roots to make soup, the leaders gathered for muttered conferences at the tent of K. Martin Flick, their elected spokesman to the Tecton—which consisted here among the refugees only of Yone and Valyu Alamain. There was much coming and going of grim faces past Livya's fire, and the air of crisis did not escape her.

Yone's tent had been set up, as always, a little apart from the main group. This time, it was on the opposite side of a rather large boulder, using the rock face as one wall,

Jacqueline Lichtenberg

"You cannot comprehend the wrong that you have done, and so for you it isn't a wrong. That is the only kind of wrong that I forgive."

spreading over a convenient limb of a tree, and anchored on the forest floor with heavy branches. The side-flaps were tied down for privacy, and all afternoon, a trickle of Gen volunteers had been going to and from his tent, donating selyn. But the grim faces told her quite plainly, it wasn't enough.

Eventually, word came down the line that they would have to do without heat for their tents this night. "Conserve what you have left, and pray your batteries don't leak. Light fires from your neighbor's when possible, and conserve your vibro-blades, too."

When her mother heard that they would sleep cold this night and for the foreseeable future, she was indignant. "We can't get along without heat! You'll catch your death, Livya. They can't do this to us!"

"They? *They!* What do you mean, 'they'? That man," Livya said, waving the firestriker wand toward Yone's tent, "saved your life today, and nearly died for it. But he didn't use one *bit* of your selyn to do it."

Evelyn Jeter recoiled. "You don't talk to your mother in that tone of voice! You have to respect your mother. Remember, it's your welfare I'm looking out for."

"How can I respect someone who can't even stick to a subject for two sentences!"

"And I suppose criminals and weaselly Simes are respectable! Standing around in public talking to such riffraff as if they were worth listening to, and they don't even make sense. Then you turn around and won't even speak civilly to your own mother!"

"Riffraff! That...that..." she pointed a shaking finger in the direction of Yone's tent "...that 'riffraff' talks better sense than you ever did. Why can't you see truth when it

happens before your eyes? You're wrong about their tentacles being slimy, and you're probably wrong about everything else too!"

"You don't contradict your—"

"I don't, facts do. That man saved us all from getting crushed today. That's a fact. He refused to let himself take advantage of me. That's a fact. He's the only thing that stands between us and death. That's a fact. And you refuse to donate even a tiny dribble of selyn to run your own tent's heating unit. That's a fact.

"Right now, Mother, it seems to me that you're the riffraff around here, and everybody thinks I'm just like you. I'm so ashamed!"

Mrs. Jeter gathered herself up into her most self-righteous stance and pointed. "Go to the tent and get to bed. You'll get no supper tonight. Think what you've said about your own mother, and tomorrow you'll apologize on your knees. You're almost a woman, and you're going to learn respect if it kills me."

"With you as a teacher, I haven't got a chance!"

"Go!" Their screaming had attracted the embarrassed stares of half a dozen people, but none would intervene.

For one tense moment, Livya teetered on the brink of total defiance, but her own feelings were so confused that she didn't know where else she wanted to be except huddled in her own sleeping bag where she could fight her way through the whirlwinds that seethed in her. She would not refuse herself what she wanted simply to defy her mother, and so she fled to her sleeping bag. At first, while the camp was having supper, she surrendered to gales of tears that seemed to feed on themselves. Eventually, she cried herself into a feverish slumber.

When she woke, the deep silence of late night was on the camp, her mother asleep beside her. In the clarity of emotional exhaustion, she realized that her anger at her mother had stemmed from her need to make her mother earn the 'respect' she demanded and Livya herself so desperately wanted to give. She had never found anyone she could really admire. Except, maybe, Yone Farris.

He had used the community selyn reserves to save her life. That was selyn collected in tiny bits during the last three months from forty-four General Class donors out of the seventy-seven survivors. There were twenty-four kids not old enough to create selyn. And there were six Distect Gens he wouldn't touch with a waldo let alone a tentacle. It seemed fair enough to her that the community should support the kids. And it seemed reasonable to keep the convicts away from their only channel since it was known that any Sime exposed to a Distect Gen inevitably goes Distect, not caring whether they kill in transfer. (*But Yone had rejected that lure, her mind told her.*) The prisoners made themselves useful around camp, and then made themselves prudently scarce. They weren't freeloading.

But she and her mother were freeloading because they could donate, but didn't.

And that, she realized, was the basis of her reaction to Brian's words. Brian had called her a freeloader, and she agreed. He had implied that she was a freeloader because her mother was a freeloader, and thus she couldn't help it. That infuriated her, and she did not agree. *She* could always help it.

She had struggled half way out of her sleeping bag before she remembered Yone's warning: "But I can't promise that my reflexes won't betray me again, so I advise you to stay as

far away from me as you can."

It was one thing to donate selyn, even over her mother's authoritative 'forbid.' When they got home maybe they'd put her in reform school for being intractable, but at least she'd be in the right. It was something else to compromise her own integrity by risking something she had agreed was wrong.

Suddenly, the whole thing became too complicated for her, threatening to smother her in frustration and ignorance. She felt an irresistible urge to move and after a few restless tosses that threatened to wake her mother, she pulled herself out of her sleeping bag, wrapped a blanket around herself, and went out into the chill night.

She stood a moment, trying to catch a glimpse of the stars through the trees. In the distance, she heard the night watch tromping through their rounds, tending the fires. There were dangerous night-prowlers in this forest. Twice, Yone had saved them from losses, once wrestling a toddler from the very jaws of a cat-like hunter. He'd killed it bare-handed.

She set off through the trees toward Yone's boulder refuge. He had warned her to stay away. The responsibility was now hers. Somehow, accepting that eased her restlessness. Whatever happened, her action wouldn't smudge anybody else's record.

But it was there, in that tent, that the answers lay. She felt that without those answers, the problems would surely smother her to death. Yet, when she drew near and heard footfalls to her left, she hung back in the shadows behind a boulder.

The steps came purposefully nearer and an arm drew aside the tent flap, spilling dancing firelight out onto the ground, and onto Cheryl Inikar. She was dressed in her hiking clothes, but her hair was down about her shoulders.

From within came Alamain's tenor voice. "You! Haven't you done enough for one day? He doesn't want you here. Go back to your tent."

"My God! What are you doing! Give me that! Didn't Brian warn you?"

"Get out of here," said Alamain coldly.

Yone's voice, choked up as if he were suppressing a cough, said "Please!"

"Don't worry, Hajene," said Valyu, "I won't leave you."

"Oh, yes you will!" said Cheryl. "Yone, give me that."

Unable to contain her curiosity, Livya crept around the rock to the end of the tent not being used as a door. Her mind was a tumult of questions. Was the Sime injured? By her or the tree? How bad? There was a crack through which she could see what went on inside, and a little of the warmth spilled out.

The tent floor had been swept clean, and on a ledge outthrust from the rockface burned a merry little fire, heating and lighting the tent. It was vented through a small hole formed where the top of the boulder drew back from the material of the tent. The space within was just large enough for the three of them with Yone stretched out on his sleeping bag. A few steaming pots of water were set about him.

The 'that' they were fighting over was a folded strip of material being used as a hot compress around Yone's forearms. As Livya set her eye to the crack, Valyu began to wrap the length of steaming cloth around Yone's arm, starting at the elbow. Cheryl streaked across the tent and ripped the cloth from his fingers. "No, not like *that!*"

Caught off balance, the Donor went over backwards, his feet kicking in the air. Cheryl circled the sleeping bag on which Yone lay helpless and took the Donor's place, deftly wrapping and twisting the compress from wrist to elbow,

finishing before Valyu could regain his feet.

Then she moved to Yone's other side where his other arm was clad in a similar, but cool, bandage and unwrapped it, dunked it into a steaming pot, wrung it out gingerly, and said to Alamain, "You may as well go. This is going to take a while, and you aren't very much help."

Valyu made a grab for the bandage. "Maybe, but he certainly doesn't want you in here!" However, as Valyu's hand closed on the material Cheryl had begun to twist, Yone's other hand came over to clamp firmly over Valyu's fingers, keeping him from pulling the cloth. "Don't. Valyu, she's doing it right. It's helping. Let her finish. Watch."

Valyu withdrew his hand obediently and watched, but although Cheryl let him see, she said, "He'll never learn by watching, Yone. It's something you have to know by experience. Look," she said as she finished the wrapping and fished a chain from around her neck. Taking the chain over her head, she slipped a ring off of it and held the crest to the firelight.

Livya choked back a gasp. The Distect outlaw had a Tecton ring, and not just any ordinary donor's ring either, but one of the rare First Order Donor's rings with the additional four stars, the very highest ranking of all the professional donors.

Lunging across her lap, Valyu grabbed for the ring, "Thief!"

With one hand, Yone caught Valyu's shirt and pushed. The Gen staggered back a few paces and stayed there, shocked beyond words. "No," said Yone. "Not thief. It's hers. Traitor, perhaps, but not thief."

Cheryl put the ring on her finger. "It's been years since I've worn this. And I won't lie to you. I am a traitor to the Tecton oath I took. But there is still a great deal of that oath I keep. I came here tonight to finish what Brian started, to honor that part of my oath that I've never broken."

Valyu burst out, "Honor! What do you know of Tecton honor!"

"Between us," said Cheryl holding the Sime's gaze, "he doesn't count, Yone. This is between Firsts. You and me. I pledge to you by our common oath to attend one another in times of need, that I will in no way attempt to undermine your Tecton values, that I will not take advantage of your weakness, and that I will use nothing that would not be used in any Tecton Center."

Eyeing her carefully, Yone said, "No Distect tricks?"

"No Distect tricks. It's *my* life that's at stake here, Yone, not just yours. If you go under, we all go with you. Your oath won't allow you to refuse my help, even if it means sacrificing your own interests for the good of all of us. My word is good. You know that, and that's all you need to know."

Yone nodded weakly. "Valyu, go and visit with your brother's family until she tells you to come back. It will be all right."

As the Gen left the tent, Yone wilted back onto his blankets and lay gasping, wracked with spasms that brought tears to his eyes. Livya found herself holding her breath, her heart pounding with apprehension at each seizure. Their channel, their only Sime, was deathly ill—and she suspected she was the cause.

For almost an hour, Livya watched Cheryl battle to keep the Sime breathing. Between compresses, she mixed a broth of powders and crushed tablets and made Yone drink it between seizures. "What did you put in that?" he asked after one sip, leery of her.

She told him, adding, "You'll feel great when it hits

"But I'm not the whole human race. And I want to survive. So do you. So does she. How long are you going to wait before you do what you know is right."

bottom." So he drank and after a bit the spasms relented. She massaged his arms thoroughly from shoulder to wrist and the cramps were soon gone leaving him looking wasted and withered against the sleeping bag.

"There," said Cheryl finishing off, "that should teach you not to go tossing trees around the forest without so much as a warm-up exercise!"

"It wasn't all from that."

"I know. And you ought to be ashamed about that, too, getting yourself caught in a hyperbolic situation with that irresponsible... excuse me... non-Donor and right on top of a protracted tenth-level Augmentation, too! Honestly, you could get yourself fired from that nice cushy Astrogator's berth for that."

"That's all right. Was my last run anyway. They were only transshipping me to a new Tecton Center. I'm a channel, not an Astrogator."

She chuckled, moving to kneel at his head and knead his shoulders hard with a rocking motion as if giving artificial respiration. "There. You feel a lot better now."

"Great."

"Could you ever teach that little creep Alamain anything like this?"

"No. But don't expect me to praise your skills in public."

"That's all right. You're the only one around who needs them."

He opened his eyes, tilting his head back on her knees to look into her eyes, upside down. "You were right, Cheryl. It would have been deadly serious if you hadn't come. I should have let Brian finish the job this morning."

"Your instincts were sound, though. Brian's not Tecton trained, he couldn't have done it this way. And if he'd done it

our way, well, you wouldn't be Tecton any more. He knew you wouldn't let that happen, so that's why he sent me."

She smiled quickly then and bent down to kiss him. "You know, my first husband was a Tecton Farris channel. Do you think I'm qualified to finish this job?"

He looked up at her for a long time before answering. "I told Livya Jeter that I'm utterly against prostitution."

"So am I. You know that. You know what I am."

"A very extraordinary Donor."

"No. Ordinary Distect."

"I find the Distect philosophy disgusting."

"I can't condemn you for an opinion founded on false information."

"As I couldn't condemn Livya for her ignorance."

"But I'm not ignorant. I used to be a Donor. I *know* what I'm offering you and what it means. It is not a demeaning prostitution for me, not even by Distect custom, because I know myself and I know what you've chosen to be."

"Tecton. Your enemy. That's what I am by choice."

"Not my enemy. Myself operating on different postulates. I learned my error and changed; you would also. Knowing that about you, I can offer this without compromise, without any Distect tricks."

She kissed him again and he kissed back. Then she moved down to lie beside him. "I promise we'll do this Tecton style. If you want the truth about us, you'll have to come and ask later when you're stronger."

She kissed him again and Livya blushed hotly but her eyes refused to blink as she watched what Cheryl's free hand was doing. Just when Livya was about to turn away, embarrassed, Yone shuddered and rolled free.

Cheryl propped herself up on one hand. "Yone. I said Tecton style. Don't you trust me?"

"It's not that."

"Yone, you have to do this. I've seen Coital Deprivation eating away at your efficiency. In this condition, the next time you try to charge a battery, the cramps will start up all over again. I might not be able to stop them with what we've got on hand. Get it over with... with me!"

"I wish it were that simple," he said from his stance before the fire.

Something in his tone drew Cheryl to her feet and across the little open space. "Yone? Oh, no! No! You couldn't have!"

"She was the first woman near me after Valyu performed that first donation on the hillside by the lifeboat. He didn't know much about Imprinting and didn't take precautions."

"Oh, that incompetent fool!"

"It probably would have happened eventually anyway. It's a permanent Imprinting."

"Yone, she's no match for you! A non-Donor, a—"

"The girl is not so bad, it's the mother. I'd lay odds Livya would have been in here to donate two months ago if her mother would have allowed it. But she's under age where she comes from, so it would be a violation of oath for me even to talk to her about donating, let alone about... this other problem. So you can't help me, and there's nothing I can do about it either. You may as well go back and get some sleep before dawn. I'll cope with the battery-charging when and how I can."

"Damn the Tecton and its unholy rules!"

"Not in my hearing!"

"I'm sorry. Yone, what if I talk to her?"

Livya found her lips compressed, a frown scoring her

smooth forehead, and her body tensed as if to jump in there and yell something like, "You'll have to talk to me yourself, Mister Channel, if you want anything from me!" The protest roared so loudly in her ears that she almost missed Yone's answer.

"I can't let you do that. If there's any talking to be done, I'll do it myself. Understood?"

"Yes, Hajene." Livya was sure she meant it. Cheryl was a woman who kept her promises, too, and that was so rare in Livya's sheltered world she had learned to recognize the 'different ones.' She had walked and lived with these two for months not knowing they existed. But now she felt a dawning kinship with them.

"Look, Cheryl, you don't seem to realize that the Jeters are genuine Sime-phobes." He paced up and down before the fire, his silhouette rippling across the shiny surface of the porta-tent. "Sime-phobia is a disease, like some people are terrified of house cats, and some people can't stand heights. You can't blame a blind man for not being able to see—and you can't blame a Sime-phobe for not donating."

"Was Livya pathologically terrified when you had her in your arms?" It was a rhetorical question.

Yone took a piece of firewood from the pile in the corner and struck it a few times against the boulder, then tossed it onto the flames, dusting off his hands. He faced her squarely. "No. She was frightened, but it was the ordinary Gen's fear, not the all-consuming terror of a Sime-phobe. But it doesn't matter, don't you see? It's her mother that counts."

"No, I don't see. It's not an inheritable disease, it's an acquired trait. Livya Jeter has lived with it, but not acquired it. Doesn't that tell you something about her?"

"Yes it does, almost more than I can stand to know!" His jaw muscles bunched visibly as he gritted between clenched teeth. "But she's a minor!"

"By Sime tradition," said Cheryl, "she became an adult when her body started to produce selyn."

Livya's breath caught in her throat. *Yes. I'm old enough!*

But Yone was shaking his head. "By the Tecton *Principles of Action* to which I am bound by oath, I am forbidden to approach her because her mother is a Sime-phobe and she's a minor by the laws of her planet of residence."

"Channel's Exemption supercedes the Principles."

"Ha!" He let out one burst of what might have been laughter. "You may be a great Donor, Cheryl, but you're no lawyer. I can't use the Exemption because it would be in violation of a higher Principle."

"Isn't that a contradiction within the Tecton's own rules?"

"No!" But he said it far louder than necessary. "It's not the letter of the law that prevents me, it's the intent. The Exemption was not devised to sanction rape—though it's been used to do that—it was meant to protect consenting adults from local laws that would interfere in their private affairs. She doesn't know me at all, so even if she were adult she'd have no basis on which to consent. And I can't *get* to know her because of her mother."

"Look,," said Cheryl on a note of desperation. "By Sime tradition, she can give responsible consent; by Tecton law she can't. By Sime tradition, as the sole channel here (like the old Sectuib of a Householding), you have the right to take her; by Tecton Principles, you can't. Yone Farris, *you* must pass judgement on the Tecton *Principles of Action*. Do they serve the purpose for which they were devised? Are they right? Do they apply here? Will you be guilty of murder and suicide if you refuse to violate the letter of those laws? Is your

interpretation of the intent of the law proper? Can rules of conduct which lead to such a dilemma be followed in the blissful certainty that they are always *right*?"

Yone turned from her, and for a moment faced the spot where Livya stood, but apparently lost in such deep thought he was unaware of her presence. After a heart-stopping moment, Livya figured that the selyn nager from Cheryl must be so strong as to obliterate her relatively low selyn field. She would have to leave when Cheryl did or risk being caught.

Suddenly, the Sime turned on Cheryl, suspicion drawing his clean-lined face into a new and fearsome countenance. "You! You can run back to your husband and tell him I won't let Distect sedition get to me!"

"Not Distect sedition—common sense! I could tell you all the answers instead of asking questions. I could show you the fundamental error in your assumptions, but I promised not to try to convert you just now. I haven't, have I?"

He regarded her silently. "Yone, to what kind of government are questions seditious? To what kind of government are they destructive? Is that what the Tecton is?"

"No." His voice was quieter now, thoughtful but still desperate. He went to the door of the tent, looked out into the night, and thought. She busied herself putting the pots away and banking the fire as an excuse to outstay her welcome. At length, he sighed audibly and turned. "No. I would not associate with such an organization."

"I know. I wouldn't work for just *any* Tecton channel, Yone."

"It may be," he said quietly, "that the Tecton is 'wrong' in this immediate situation, but what happens when we get back and Evelyn Jeter starts screaming rape or seduction? The basis of the Sime/Gen Union is trust; trust in the channels and our absolute adherence to the *Principle of Action*. Maybe, just this once, it wouldn't matter. But suppose all the channels, everywhere, started interpreting the Principles for their own convenience? The Union would crumble, and we'd be back to the Chaos again where Simes killed Gens for selyn and Gens tried to exterminate Simes."

"I've heard all that before," she said, rising to face him. "Tell me, Yone, how can *right* lead to *evil*? Is that the kind of universe you live in? A place where *wrong* leads to *good* and *right* leads to *evil*?"

"No. The Principles lead to right action, and that results in *good*, in survival for the whole human race."

"But I'm not the whole human race. And *I* want to survive. So do you. So does she. How long are you going to wait before you do what you know is right, until these rules which you know are wrong lead us all to disaster?"

"The rules by which I guide myself are not wrong."

She sighed. "OK, I promised not to prove the Tecton wrong. Look. This time you weren't paying attention and led us up under a falling tree. Next time you'll walk us off a cliff, or lead us into an ambush because you didn't notice a tribe of natives getting set to roll boulders down on us. You condition is dangerous to the group, so by Tecton standards it's unethical for you to allow it to continue no matter what the price to any one individual."

"The infringement of the sovereignty of any individual by any channel imperils a much larger group than this one. It may be hard on us, but we must do it for all humanity."

"Damn the...! No, all right, this way. You know the CD's are no joke for a channel, especially a Farris. How long do you think it's going to be before entran sets in, too? I've seen those seizures actually break bones, and you know what that

would mean out here! Entran and the CD's together? There's just so much the human body can take before it starts to give up, and whether you like it or not, you're only human and you can't carry the whole human race on your back, at least not if you don't take care of yourself!"

There were tears on her cheeks glinting in the reflected firelight. "Shall I describe what a case of severe multiple deprivation looks like? Yone, I used to work on the frontier—I've *seen* it, and I never want to see it again. It starts with a niggling little infection, a kidney or bladder infection, nothing serious. Fever and chills, then pneumonia. Finally, the liver starts to give out, and from there it's straight downhill to the grave, a very messy grave, Yone Farris!"

"It's only Coital Deprivation, nothing so bad as all that!"

"I'm giving you my professional diagnosis. Acute multiple deprivation with an Imprintation complicating matters. If I have to, I'll take you by the ear and march you over there and make you explain it to her sensibly!"

"It's not that simple, I told you. She's a minor!"

Cheryl sighed heavily, deflated but not defeated, weary but not vanquished. "It's almost dawn. This is getting us nowhere." She took off the Tecton ring and stowed it on the chain, tucking it beneath her clothing. "You better get a few hours' sleep. Maybe your head will be clearer in the morning. I certainly hope so, because if you don't do something for yourself soon, I'm going to do it for you."

She paused at the tent flap, and Livya, recalling her resolve to slip away unnoticed, scurried around behind the boulder where the mass of rock would insulate Yone from her. As she moved, she heard muttered goodnights from the tent, and then footsteps, a few words with a perimeter guard, and silence.

She had wanted facts, and now she had them in blinding abundance. The Channel's Exemption was not, as her mother said, legalized prostitution.

If she was wrong, then she'd have to learn to live with it. But whatever happened, Yone Farris wasn't a man she could abandon.

She started around the boulder toward the tent door.

Half way there, Yone met her, and the graying dawn revealed his gentle smile, peaceful at last. "Livya. I've got to talk to you."

"I know. I was listening to you and Cheryl in there all night."

"Yes. I felt you leaving. I couldn't let you go."

He considered her intently but didn't reach out toward her yet. She said, "What are you going to do?"

"We are going to do a lot of things, Livya. But first, it's time we had a little talk about what it means to be grown up enough to love."

—G—



JEAN
MORRISSEY '77

David Grigg

TO SPEAK OF MANY THINGS

“Hello, James. I can’t see any sign of those alien rocketships, and I’m getting the creeps down here. I’m coming up.”



HE ANTENNA of the radio telescope swung in a great slow arc to track and follow one of the bright stars above.

In the control room that sat on the lip of the vast crater that was the bowl of the telescope, a man began to take measurements. He was a small man, and an old one. His face was wrinkled around, but the wrinkles seemed to follow the laugh-lines of his expression. He was balding, and what hair he had left was turning grey. He paused for a moment, and bent to look at the data being printed out by one of his instruments. After a moment, he reached over from his seat and switched on an intercom.

“Hello, Homerson,” he said into it. “Getting some damn funny data here. It’s the alpha line from Beta Hydri again, just like last week. Looks like we’ll have to let the computer get its teeth into this stuff.” He switched the intercom over from ‘send’ to ‘receive’ and waited, still looking at the information coming from the machine, and at the continuous stream of paper tape it was punching.

There was a click, and after a moment a voice said, “Hello, James. Have I expounded my latest theory to you yet? It’s my new theory of Cosmic Inflation.”

“Oh no!” said the man in the control room. “Not that one!”

“Well,” continued the intercom, “I’m sure you’re interested. To put it briefly, it’s a theory which reconciles the apparent differences between the Big Bang and Steady State theories of the origin of the universe.”

The man in the control room smiled, and peered through a sighting device to make sure the antenna was still on target. The paper tape kept on coming. “Yes, Homerson, go on!” he said, largely to the air.

“Well, James, you see, the now discarded Steady State theory assumed that matter is continuously being created out of the void. Naturally, the critics of the theory claimed that this ran counter to the generally accepted Law of the Conservation of Matter. What they neglected, of course, and what enables me to revitalise the theory, is that the real law is not the Conservation of Matter, but the Conservation of Mass-Energy.”

The data from Beta Hydri was decidedly funny. It was possible that after all this time he had really discovered something worthwhile.

The voice from the intercom rambled on. Homerson’s problem was his long-windedness. The phrase “Brevity is the soul of wit” went disregarded by him.

“So my thesis is that *mass* is conserved, but that *matter* is not. As each new atom of hydrogen comes popping into existence, in a miraculous fashion, no new mass is created along with it. Instead, that new piece of matter shares the rest of the total mass of the universe. In other words, there is a steadily increasing amount of matter in the universe, but a constant, finite mass. So that all matter, as time goes on, has less and less mass. A kind of Cosmic Inflation.”

The man in the control room groaned, got up from his seat and went off into another area of the control centre, still listening to the intercom. There were crude kitchen facilities in the centre, and he got out a plastic packet of baked beans, took a pair of scissors from his pocket, and snipped off the top of the packet. Then he took a spoon from his other pocket and walked back to his instruments, eating the beans cold. He smiled as he passed the refrigerator, which bore a sign reading: “Whatever happens, never let it spoil your dinner.” He sometimes thought that slogan had helped keep him alive

in recent years.

Homerson's voice over the intercom ran on. "Now, cast your mind back to the first few days of creation, when—" The voice suddenly stopped, and the intercom produced a fine series of screeches and static-filled gurgles. "Damn!" said the aging astronomer. He put down the packet of beans, and went back to his seat and snapped off the intercom, cutting short its gabble. He made sure the radio telescope was still tracking Beta Hydri, and that the punched tape with the data on it was still running smoothly, then went into the room next to the airlock. He spent a few minutes putting on a spacesuit, by which time his face was red and his breath gasping, and then entered the lock.

Outside, the landscape was desolate and forbidding. Dust and craters, large and small, with an occasional outcrop of rock, provided the only scenery the base had except for the great radio-telescope itself. The only illumination now was from the stars. The moon's slow dawn was a week away, and the base was at the opposite side of the moon from the clean brightness of Earth. Here, there was no atmosphere. Here, there was no frantic background of radio and television transmission. The back of the moon had seemed an ideal place to build an observatory, even though the scientists had been removed from the rest of humanity. Although, thought the old man, perhaps even here they had not been far enough removed.

He walked around the edge of the vast crater. Even starlight was enough light to see your way, once your eyes had adjusted. The delicate spiderweb that was the antenna of the radio-telescope hung poised over the huge bowl. But the old man kept his eyes set on the visual telescope, and the single light burning in the living quarters. He had walked this path so often that his feet knew the way, and he hardly needed to think about where he was going.

He reached the lock of the living centre, and pressed the button to set the operating cycle into motion. This was often an anxious time for him. During the long lunar night, the observatory's power was drawn from batteries charged during the day. If there were not enough, if there had been some leakage, then the door might not open. But now, the signal light blinked green, and he entered. He took off the spacesuit as quickly as he could.

The corridor was dark. The only light came from the open door of his office, down the end. When he got there, he had to squint, as his eyes adjusted from the dark.

The rooms combined the functions of living space and office in one area. Against one wall of the office was a mini-computer, together with typewriter interface. On a table, connected to both the computer and the intercom by a complicated device, was a tape recorder. Tape from the machine was slowly unwinding from one reel and spooling over the floor. To this he went immediately. He turned off the power, and fiddled with the take-up reel.

"Damn!" he said. "This machine is getting too old to be useful. Just like me." He bent and picked up an armful of unwound tape and placed it on the table. When he had done that, there was complete silence.

James Homerson sighed.

Someday he would tire of this polite fiction of not being alone, and then he would probably have nothing left to do but die. Sometimes he wondered if this talking to himself by remote control did not lie on the near edge of insanity. But then, that would hardly be surprising.

His work for the evening finished, he went to the cupboard

that he used as a library, and selected a paperback to read before he went off to sleep. He remembered how his colleagues used to mock his eccentric taste in books: largely pulp science fiction of the most sensational kind. Now that most of the dramatic predictions of the pulps had come true, he had the last laugh. But it was, he knew, the hollowest of laughs.

In his bedroom, he found that he had read the book he had selected a half dozen times before, so he put it to one side and turned out the light.

Outside the window, the dim starlight was just sufficient to outline the twenty rough crosses that stood in white rows.

"Ah, James," he said, "you're starting to take things seriously again. Not like you at all. You need a holiday. The Gold Coast, that's it. The Great Australian Barrier Reef and all that. A nice half a million mile round trip from here. But then again, I'll bet you can't rent a room there now for love nor money." He smiled at the morbid jest, turned over, and went to sleep.

The next day was announced by his alarm clock. Outside, it was still dark and would be for another week. It always made Homerson think of getting up before dawn to milk his father's cows. As usual, he breakfasted from his stockpile of food from the store, heated over an electric stove. He spent some time while eating working with a screwdriver on the tape recorder and winding up all the spilled tape. Then he set the drive in motion, checked to see everything was working, and hooked it back into the intercom.

"Good morning, James!" he said into the intercom. "I'm off down the Hole today to check out my idea that quasars are interstellar ramjets driven by aliens. I reckon that if I can detect the right kind of neutrino flux, I'll be set up for an article in *Nature*."

Years before, *Nature* had been pleased to run some of Homerson's serious contributions to scientific inquiry. Back then, his more odd-ball theories had been merely to make fun of and amuse his often dry-as-dust colleagues. But now, the editors of *Nature* were drifting radioactive dust, and Homerson could allow himself the leisure to investigate all of his favourite unlikely ideas.

He packed half a dozen food-packets into his haversack, together with his pocket calculator, and three paperback novels. He often spent days in the Hole—it was best to be prepared.

The Hole was a mile-deep shaft drilled during the early years of lunar exploration to investigate the interior composition of the moon. It had long outlived that purpose. In later years, the shaft had been used by the astronomers at the Observatory to detect those elusive particles, neutrinos. A mile beneath the surface, all other radiation was effectively screened off, but neutrinos, ghost-like, flew straight through the entire bulk of the moon without pausing.

The Hole was six miles from the rest of the Observatory. To get there, Homerson had to take the crawler. This was virtually a spaceship on wheels, complete with airlock, and weeks of supplies, designed to keep the crew alive in case of a breakdown far from help. The crawler had saved Homerson's life once. Now he climbed into the driving seat, and headed the vehicle off towards a distant marker.

To his left as he drove, starlight glinted off the acres of solar energy panels, which still kept the Observatory supplied with abundant electricity. All of the machines at the base still ran, all the instruments could still observe. Even Homerson, the observer, was still alive.

He soon reached the final marker along the path, and the huge lift gantry that stood above the shaft.

Getting into the lift meant putting on the spacesuit again, a procedure which always annoyed him, but it was unavoidable: the lift was not pressurised. It was an open, rickety affair, and his stomach always fluttered when he had to use it. But there was work to be done. Hampered by the bulky spacesuit, he stepped into the lift and pressed the down button to start the slow, shuddering descent.

On the way down, Homerson hummed a tuneless hum to himself and discovered again that he couldn't scratch his nose while wearing a spacesuit. He spent the rest of the descent pondering some improbable new design feature that would eliminate this difficulty. None of his ideas for this had the slightest hope of working.

The lift stopped. Homerson started hand-cranking the door of the airlock set into the stone wall in front of him. He stepped in, closed the outer door, and started the same procedure on the inner one. It opened on a rough-hewn stone corridor. He reached out and snapped on the electric light. Moisture gleamed along the walls.

At the end of the corridor was a huge cavern, almost filled with the bulk of a massive tank of liquid. Instruments and electronic equipment were attached to the tank like barnacles on the side of a ship. This tank, a much more sophisticated version of earlier models, detected the incredibly rare collisions of neutrinos with matter, and helped determine their energy and direction of impact.

Homerson sat down at the instrument board, which was hooked into the computer above ground by means of a terminal outlet. He began to program the experiment: Look for *these* type of neutrinos from *this* direction, analyse statistically, then print out results and go on to the next direction. In a week or so, the instruments might come up with enough information to let him decide whether or not he was on the wrong trail entirely. Homerson really had little doubt that he was chasing his own tail. Although he was convinced that somewhere in this vast universe there were other intelligences, he didn't expect to detect their works this easily.

While he waited to see what the results would be, he could sit and read, or play his never-ending game of pontoon with the computer, to which he was now in debt to the sum of several million dollars. It hardly bothered him.

BUT AFTER HOMERSON had been down the Hole for four hours or so, he suddenly looked up from the book he was reading, and stared at the telephone that was mounted on the stone wall of the cavern.

He was thinking of the day, years ago now, when he had been here doing some rather more serious study, when the phone had rung, filling the still air with discordant sound. As soon as it had rung, he had felt that there was something wrong. He had been right.

It had been his old friend and colleague, John Pilgrim.

Each time Homerson came down the Hole, sooner or later he heard that phone ring in his mind, imagined himself picking up the receiver and heard again John Pilgrim's shaken voice:

"Homerson... we've got a problem up here..."

And Pilgrim had gone on to describe that problem to Homerson. The scientists at the Observatory had been listening to a news program about the worsening relations between the United States and the People's Republic. They

David R. Grigg

"I'm convinced this broadcast is being made by an alien computer, and I'm afraid to tell it I'm human in case it gets offended."

had been interrupted by the sight of an impossibly bright flash on the nearby horizon and their instruments suddenly running wild. Only minutes later, the program, which was relayed by circumlunar satellite from Earth, announced the beginning of a nuclear attack on America. Then it ended in a burst of static. The Chinese must have been planning their attack for days, and sent missiles on their way to the Moon to wipe out the American bases there, timed to hit when their main attack began. The missile aimed at the Observatory had missed. But not by enough. In seeing that flash, even before the radiation counters told their grim story, the scientists had known they were dead men. It had taken them twelve hours to remember Homerson, doing research down the Hole.

Homerson sat deep in thought, remembering. At last, he shook his head, and went to the phone to dial his office number "Hello, James," he said when the call was answered by the computer. "I can't see any sign of those alien rocketships, and I'm getting the creeps down here. I'm coming up."

"Hello, Homerson," said the phone. "Did I tell you about the time when I was first coming up to the Moon, and there was this stores clerk who wanted to know what purpose was served by the colour television receiver I was bringing?"

"Yes, James," he said, hanging up the phone. "Many times." He sighed, and set off back to the surface.

He had tried to find out what had happened, of course. He had taken the crawler and made the long journey around the edge of the Moon until the Earth came in sight. But his radio antenna brought in nothing but static, and one of his more sophisticated devices had enabled him to measure the surface temperature on the lovely blue and white globe. And when he had the results of that, he had turned the crawler around and headed back to the Observatory.

GALILEO 61

The slow lunar dawn was but hours away. Soon, the sun would raise its burning edge above the horizon, and flood the desolate plain with fire.

The lift rose jerkily up the shaft, to come to a halt at the surface. He clambered inside the crawler, and set off to the base. Working in the spacesuit was hot work, and by the time he reached his office, sweat was pouring from him. He sat quietly for a long time as he tried to recover from his exertion. At last, he took a glass of clear water from the recycling system, and went over to the computer. Piled next to it were tangled lengths of punched tape which was his data on the peculiar emissions from Beta Hydri, made over a period of a week. Homerson had been meaning to get the machine to analyse them for some days now. He squatted down and spent some time carefully sorting out the tape, being careful not to tear any of it. He had a set of standard programs on file which he used each time he did this sort of thing. The first program was more or less a long-standing joke. His colleagues had called it the 'Little Green Man' program. Its purpose was to discover any patterns in the data.

The tapes sorted out, Homerson called up his program, and let the machine analyse the tapes that he fed it.

The computer chattered busily to itself as it ingested the paper tapes. Homerson went over to a bench and made himself a cup of coffee. He came back to the computer with the cup in his hand just as the typewriter began typing. He bent over the paper as he sipped his coffee.

File BT 948 LGM

Run #1

String iterations detected

String[1] Iteration 90 bits in length

String[1] Iterated 192 times in this run

String[2]

Homerson over-rode the automatic printout and sat down at the typewriter looking at the apparently simple message

62 GALILEO

printed on the endless paper. His program had been set up to analyse each day's run on the star, and to record any lengths of input, or 'strings' which had repeated themselves during the run. If the emission had been random, as he had expected, any repeated strings would be short, or infrequent. This was clearly not so.

Print string[1], he typed.

The typewriter began work immediately:

1/10/11/100/101/110/111/1000/1001/1010/1011/1100.

The natural numbers, from one to twelve, in binary code.

The irony of his position swamped Homerson. It seemed there was no doubt: here was a simple message from the stars. Somewhere out amidst the great emptiness of space, twenty-one years and a hundred and twenty-five trillion miles away, some unknown, unknowable being was tapping away at a key: one, two, three... And of all mankind, he alone remained to hear that message.

Then he was puzzled. Surely, if all that the signal was doing was to repeat that count, he would have noticed that himself when he was listening to the signal before. Then it had seemed random and complex, not this simple "Here-I-Am" message. He turned off the terminal, deep in thought. Outside, the magnificent desolation of the Moon had changed not one iota. He donned his spacesuit again, and set off back to the radio telescope control room.

Before, when he had been monitoring those strange emissions from the star, he had listened to the radio signal for a few minutes, and then had become bored with the noise and turned it off.

The great antenna was again tracking Beta Hydri. Homerson sat in the control room, listening to the signal. This time he listened patiently for three hours.

He timed what he heard. Seventy-three and a half minutes of the seemingly random chatter he had heard before. Twelve and a quarter minutes of a complex, but apparently coded signal. And just over six minutes of the simple counting-to-twelve signal. Then the seventy-three and a half minutes again, and the pattern kept on repeating. Except that the signals in the long and medium stretches seemed not to be repeated exactly each time.

He switched on the intercom. "James!" he began, but stopped suddenly. If it had been John Pilgrim on the other end of the line, or any of his old, long dead colleagues, he could have astounded them with the news, could have said: "I told you so," could have shared his joy. But there was only the slowly turning reels of the taperecorder. He turned off the intercom. There was no one there. There was no one anywhere, except himself. And the aliens.

Homerson thought about the timing of the different kinds of signal. It seemed to make sense. There would be little point in broadcasting: "Come In, Out There" all the time until a reply was heard. With the speed of light being such a snail's pace among the stars, it would take years for that to happen. The signal Homerson was now listening to had been travelling for twenty-one years. Better for the aliens to transmit the simple Here-I-Am, a language key and complex information all at the same time. Anyone picking up the simple signal would record all of the transmissions, and come back to the information there when he had learned to understand it.

Very well, Homerson would learn to understand it.

As the days passed, Homerson collected more and more tapes of the alien transmissions, and with the help of the computer, began to analyse them. He was fortunate in one

TO SPEAK OF MANY THINGS

respect: Beta Hydri was sufficiently close to the South Celestial Pole that it did not set from the latitude of the Observatory, and so his observations were not interrupted for two weeks as the Moon turned slowly through its day.

He found that the twelve and a quarter minute message repeated every nine and a half days. The longer, more complicated message had not repeated at all while the tapes were running. Homerson did not expect it to do so while he lived: there must be an endless amount of information to be broadcast.

He was working himself too hard. Since he had begun analysing the alien transmissions, he had been doing with little sleep and less food. Once, walking in his spacesuit between his rooms and the radio-telescope control centre, his heart began pounding erratically, and he had to sit down in the black dust while he held a hand to his chest and prayed that he would not die. Not now, he thought, not now that after all this time there is something to live for. And the pounding had gone away, after frightening him badly. And he went on with his work.

Track Beta Hydri, he told the computer.

Tracking star Beta Hydri, it replied, and in the crater, the huge antenna swung under the computer's guidance.

The key to the messages was a nine day long series of lessons. After the computer had analysed them, Homerson recognised them as ingenious. He found that he learned easily. Simple mathematics combined with simple cartoonlike pictures made by rows of ones and zeros provided understanding of basic ideas. Each piece of information he learned, he entered into the computer. He ate and slept next to that machine, and in his sleep, he dreamt of talking face to face with monsters.

Even when he had the code learned, it would take him years to unravel the complex mass of signals from Beta Hydri. If he lived long enough, he could probably program the computer to solve the problem and put the information on tape. Homerson had no idea how long the computer could operate without being serviced, but it was probably quite a long time. It seemed a futile gesture, this: there was no one to listen to those tapes. But Homerson was trained a scientist, and more particularly, an astronomer—the concept of abstract knowledge for its own sake had been trained into him long ago.

But more importantly, when he had the code learned, he could reply to the stars. The alien message seemed to keep on getting replies, no matter how long delayed. There were simple instructions on how to communicate using receiving equipment, something Homerson already knew.

There came a day when he understood each one of the course of lessons, and had gained an understanding of how the simple code translated the complex information. All of the code was programmed into the computer. The great radio telescope was as capable of transmitting as it was of receiving, and it was pointed at its target.

Homerson sat before the computer terminal, looking out of the window of his study. The slow lunar dawn was but hours away. Soon, the sun would raise its burning edge above the horizon, and flood the desolate plain with fire.

Memory came back to Homerson like that imagined flood of light. For the first time in many days he recalled the terrible war, and the twenty graves outside. He thought of cities swept by firestorms, of millions of people dying quickly, or like John Pilgrim and his other friends, slowly, from the horror of radiation sickness. Of the insanity of Man.

Eventually, Homerson turned off the electric typewriter,

David R. Grigg

and went walking slowly around the silent Observatory. He walked into the mess-room, and looked for a while at the rows of empty tables and chairs, and heard the echoes of laughter and talk. He walked off slowly through the hollow corridors, his hands clasped behind his back.

His feelings were confused. He missed his old companions now more than ever he had during the long lonely years. "I'm convinced this broadcast is being made by an alien computer, and I'm afraid to tell it I'm human in case it gets offended," he would have told John Pilgrim. Or: "These aliens tell me my theory of Cosmic Inflation is correct. You should hear the price of uranium out there!" But it was all in vain. There was no one to spin tales to any more. He no longer had the spirit to call himself up and tell improbable tales to the tape recorder. Because, after all, there was someone to talk to.

He was back at his office. He went in and turned the typewriter back on.

Fetch File Translate, he typed.

File Translate BT 963 / Ready, it replied.

Transmit text Beta Hydri, he entered.

What do I say to a bunch of aliens? he thought.

He paused again, and looked through the window to the small graveyard, and to the crosses he had erected one by one, more out of a sense of duty than of religion.

He began to type.

I speak for the peoples of Earth, he typed. *Life for mankind is idyllic. We have a unified classless society, and no man ever goes hungry.*

Long ago we solved all of our social problems. We have no more war.

Our science is equally advanced. . .

As he typed, Homerson began to smile.

—G—

BECAUSE OF THE WEIGHT, we had only one holovision on Signal Station. Orlov had kept me a little late, adjusting the laser mirror, and by the time I got to the common room, the news had already begun. I spotted Valentina and took a chair next to her, on what had tacitly become the Soviet side of the room. Doctor Pogodin sat several rows in front of us, but somehow he sensed my border incursion—he turned around and gave me his beady stare. I ignored him and concentrated on the HV image.

The lead story was still Iraq. The BBC showed a tape of what they claimed was a skirmish between American and Soviet troops, then cut to a statement by Secretary Jansen who admitted the fighting but denied that American forces had taken part. Moscow was still maintaining silence about the whole affair. A BBC Commentator surmised that this mutual effort to keep the lid on was a good sign, and suggested that we might expect to hear of positive results from the Stockholm talks in the near future. Myself, I wondered how we were going to get out of this one without someone using at least tactical nuclear weapons.

When the station break began, I turned toward Valentina. She kept looking straight ahead, as if nothing could be more interesting than announcements of forthcoming shows which Control would never beam us anyway. I could do nothing but follow her example.

Only something the size of the Iraq mess could have pushed the Mars story back beyond the break—the Mars business did not seem very important in the scheme of things, but it had lots of Human Drama. Nothing had really been learned since that morning, but now the transmission had been computer-processed, cleaned up enough to be intelligible to the lay public. We could watch in flatscreen color as the Soviet crawler sank into what looked like typical orange Martian soil. Pressure-suited figures scrambled over the machine, unloading containers and instruments onto firm ground with the dual purpose of saving the supplies and perhaps lightening the crawler to the point where it would float. Of course the thing continued to sink, until even the dish antenna on the roof was buried, breaking off contact with Earth.

I didn't have Pogodin's penchant for direct staring, but out of the corner of my eye I tried to follow Valentina's reaction to the news of her countrymen. There wasn't much, so far as I could see. But Valentina was a very self-contained person.

With British disinterest in what it did to the pacing of the program, the HV cut to an expert panel gathered by the BBC. Amid much hesitating and harrumphing, the panel collectively decided that the crawler's sounder had malfunctioned, and that the machine had driven onto some sort of pool of hydrocarbons or silicones covered with wind-blown sand. Something a little like a tar pit. This would be very exciting if true (we were told) since such a deposit could give support to the idea that in the remote past Mars had had fairly advanced life forms.

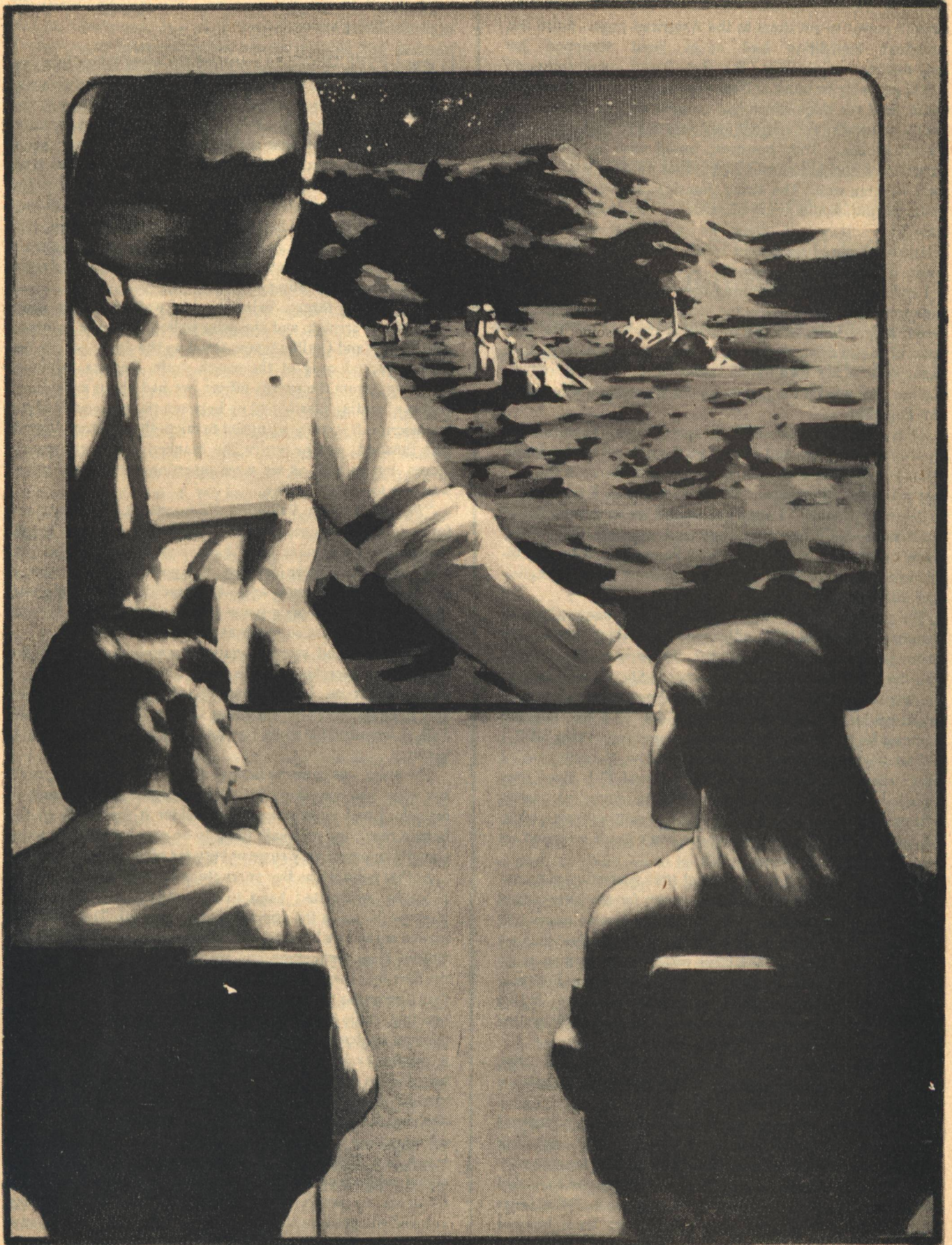
Communication with the crawler's crew had entirely ceased. One of BBC's savants speculated that, if they saw any reason to spend time doing so, the crew could probably adapt a pressure suit's intercom into something which could receive from one of the relay satellites in Mars orbit. The others immediately jumped on him.

The moderator intervened and asked if it wasn't in any event, clear what the next move would be. Yes, said the tame experts. The crawler had sunk four thousand kilometers from Brezhnevsk, but it was only a thousand kilometers from New

Patrick McGuire

A SIGN OF FRIENDSHIP

A BBC commentator surmised that this mutual effort to keep the lid on was a good sign . . . I wondered how we were going to get out of this one without someone using at least tactical nuclear weapons.



America. The crew had unloaded their 'Marsokhod' safely, and this vehicle's accumulators doubtless had a full charge from the crawler's nuclear reactor. It would be more than enough power to get them to the American base. Since the American expedition had never been equipped for long-distance exploration, the five Soviet crew members would probably be stuck at New America for the next several years, until the ships which had brought the two Second Expeditions home were refitted and returned to Mars with the Fourth groups. This, however, would work no particular hardship on the Americans, since their ice mine and garden were working well. The airing, housing, and feeding of five extra people would be well within the capacity of New America. It might even be good for international relations—before the recent chill it had, after all, been planned to exchange personnel.

I smiled to myself, wondering how the Soviets and Americans would like this unexpected intimacy. Already I had enjoyed the proximity of Valentina for nearly a year. The prospect of another four or five would be entirely pleasing, save perhaps for a few lead-us-not-into-temptation pangs of conscience. But what if the people on the Marsokhod were more like Pogodin?

After the Mars report came the sports news. Valentina got up, still ignoring me, and started for the defacto Soviet dining area. I caught her arm. She turned, and made as if she had just noticed my presence. "Oh, good evening, Kenneth."

"Privet," I said. "I hope you realize we're getting out of our routine—we haven't done any work together in two days. Hadn't we better get to it tonight?" Valentina and I were collaborating on a spec fic novel: Simultaneous texts in English and Russian.

She gave me one of those 'frank' Russian stares that can mean any of several things. "Do you really think that is wise under the present circumstances? There is so much going on—the Iraq trouble, and now Mars..." She glanced over in the direction of the estimable Doctor Pogodin, who might or might not be within earshot. It was widely held that Pogodin made up for mediocre physics by regular reports to the KGB.

"So maybe the Others are going to show up tomorrow," I said, irritated. "Maybe they've discovered FTL since they signaled. It's only professional to keep going no matter what's happening outside. Besides," I added more softly, glancing at Pogodin myself, "if we don't get it wrapped up soon, do you think we ever will?"

Valentina started to answer, and then paused. American-Soviet relations had reached their zenith for the twenty-first century at about the time when the Signal Station treaty had been signed. It had been downhill ever since. Now that we had just about finished the laser projector, it seemed more than slightly dubious that we could keep the station in operation long enough for the Others to detect our answer. It also seemed to be now or never for our personal collaborative effort.

Valentina gave another look at Pogodin, and then shrugged. "I suppose you are right," she said. "Shall we meet at the usual place in two hours?"

I nodded. The usual place was one of the little study rooms in the Soviet half of the station. I was reasonably certain it was bugged, perhaps with a device that patched into the telemetry to Earth, but the bug would only convince the KGB that we were doing what we claimed—writing a novel. Other ideas had occurred—did occur—to me from time to time, but the Soviet leaders rarely let anyone out of the cage without hos-

tages, and Valentina had a husband and two children in Leningrad.

"Ladno," I said. "Do pozzhe." We walked toward our separate dining areas.

AFTER DINNER I retrieved the story folder from my locker and started toward the study room, which was located about a third of the way around the Soviet part of the ring. In all that distance, I did not meet one person. At that time of 'day'—GMT day—there should have been considerable visiting going on. Russians will drink and talk all night if given the least excuse, and many of the other Soviet nationalities are equally voluble. I could only conclude that the word had been passed to stay out of the way of Americans. Things had changed in the year or so since I had found out that Valentina was my chief competition for the spec fic tabs in the library.

Threat or no threat, Valentina was waiting in the study room when I arrived, and she even smiled when she saw me. The Roman and Cyrillic typers stood on the desk, next to her neatly stacked copy of the rough draft. Despite recurrent complaints from the supply officer, we had about a thousand sheets of writing plastic tied up between the two copies of the manuscript. Naturally we meant to micro the creature when it was finished, and to return the blanked sheets to general stores, but so long as we were inserting corrections, micro was just too much bother.

"Privet," I said to Valentina. "Zdrastvuite," I added more formally to the electric socket. Valentina gave a short laugh, though the joke must have been wearing thin. The bug probably wasn't there anyhow, but you have to localize it somewhere, and there is an ancient tradition of blaming wall sockets. And telephones (even when switched off) - but the study room had not so much as an intercom.

I sat down and started leafing through my copy of the manuscript, searching for the sheet I had marked. "Tak," I said, "na rabotu. I found another soft spot. The way Ovan acts when he leaves the Nameless City and first meets the Hill Folk is too altruistic to be credible. We've got to motivate it better."

The novel was closer to fantasy than I usually like in spec fic but when you considered the Others' signal (and because of my job, I had more reason to consider it than 99% of the human race), the only safe thing to do seemed to be to write something either very close or very far off in space and time.

At that point it was five years since Caproni had discovered a bright, modulated band in the middle of a Fraunhofer absorption line in the spectrum of 82 Eridani. The band had turned out to be a laser signal. Its strength suggested that the Others' laser technology was not vastly beyond Earth's, and the fact that they had used laser at all raised the possibility that their radio technology might be backward; from our perspective, radio would have been much the better solution to the communication problem. The Others' signal went through a complex cycle which lasted about a year (possibly exactly a year for the Others' planet), and then repeated. Each cycle started off with introductory pulses on the order of two plus two equals four, and then went on to demonstrate numerous commonplace mathematical theorems, and a few others which had Earth's mathematicians very excited. Then the signal progressed into unintelligibility. No periodic table of elements, no picture-matrix formed from bits whose quantity equaled the product of two prime numbers, not much of anything that had yet been understood.

Under these circumstances, perhaps the sensible thing would have been to remain silent, for decades if necessary, until we had deciphered more of the signal. But since when has the human race as a whole ever done the sensible thing? Within weeks after reception, several nations had sent out answers on existing radio-telescope arrays, each hoping to get their version of affairs through first. Furthermore, in case the Others could not detect radio, it had been proposed to build a laser projector to answer the signal in kind. Thanks to a rare attack of rationality, the United States and the Soviet Union were building this jointly. Our projector was smaller than the Others', but if they were watching for an answer they should pick it up with little trouble. A fairly powerful and extremely accurate dynamic gas laser put out a signal which we focused, by means of a mirror especially cast in space and a special lens system, down to about .02 seconds of arc. This beam was so narrow that we would have to make assumptions concerning the location of the Other planet's orbit around 82 Eridani in order to hit it. The aiming system was fantastically complicated. The frequency band was so narrow that we had also to compensate for Doppler shift as the Station orbited the Earth and the Earth orbited the Sun. The fine adjustment all this entailed had made it seem advisable to make the Station a manned one, and indeed we had been there tinkering with the laser projector for well over a year. Another year or so and we would have the focus and the Doppler compensation down to the accuracy we wanted. We hoped.

In addition, one of the more subtle results of the Others' signal was that I could not put my heart into short-or medium-range spec fic. The decoding of another paragraph of two of the signal message might shake scientific theories, start new religions, inspire new art forms, destroy the economy - who knew what? It wasn't like extrapolating from our own society in isolation. Oh, to be sure, there were constant natural laws and so forth, but somehow that did not seem enough, at least to my creative subconscious. (Valentina, I think, had liked softer spec fic to begin with. I was always the one arguing for some sort of rational explanation.) In consequence, our Ovan might or might not be Terrestrial-descended, but in any case he lived a long time from now and far away.

Valentina quickly scanned the pages I had indicated and then shook her head. "No," she said, "I think the motivation there is clear enough. At this point Ovan has already answered the Third Question in the City, and in doing so he has shown the reader that he has a high degree of class-consciousness. That same consciousness would cause him to recognize the identity of economic interest between the Folk and the Third Caste."

"It might if he had read Marx or Lenin," I objected. "but he's never even heard of Earth."

"He knows about gravity and he's never heard of Newton. Social laws are simply one particular sort of natural law."

We were off into another argument. When we got into one of these ideological fights I was never sure how much Valentina believed the case she herself was putting forward, which made them all the more confused and pointless. Many or most Russian intellectuals were non-Marxists at heart (though the percentage of true believers had risen since the Krilov reforms), but the majority were pragmatists. You had to say certain things to get past the censor, and after a while you did it automatically.

Nor was the ideology the only point of friction. We were working out of separate traditions. V.F. Odoevsky was a

Perhaps the sensible thing would have been to remain silent, for decades if necessary until we had deciphered more of the signal. But since when has the human race as a whole ever done the sensible thing?

contemporary of Edgar Allan Poe. Vladimir Obruchev and Edgar Rice Burroughs had gone in completely different directions despite their common hollow-earth idea. There was some cross-fertilization: Wells had influenced Zamyatin, who had influenced Orwell; the Strugatsky brothers had borrowed ideas from Clarke. But essentially we still maintained different sets of conventions. If you were to read Adam Hall's *A New Start* right after Sergei Zenkovsky's *Dawn*, you would detect only a remote similarity. But if you sat down with a scribe and wrote out the two plot summaries, you'd find they were almost identical. Valentina and I were trying, more for the fun of it than out of exalted artistic motives, to write something which would be intelligible in both traditions.

"All right," I said finally, "you can have your way about the Hill Folk, but on two conditions. First, back in the City we have Ovan talking to one of the Sages or reading one of the books in the Keepers' library. You're not going to convince me that Ovan could think up that sort of thing by himself. Second, we tone down the attack scene. Ovan can't have his consciousness raised all *that* damned fast."

"But the attack scene provides the entire justification for--"

A knock sounded at the door. Valentina slid it open, and there stood Pogodin. He stared at me pointedly and said, "I'm sorry." By this he meant "Excuse me." The Russian *izvinite* means both, and Russians tend to mix them up in English. (On the other hand, since you ask, Russian has six different words for 'go'.)

"Much as it pains me to interrupt a collaborative exercise so promising as yours," Pogodin continued, "the Station Director has requested that all off-duty cadre assemble in the common room. The American Secretary for Air and Space is about to make what apparently is an important speech."

Valentina and I exchanged glances. Leaving everything in the study, we both set off down the corridor. By Unspoken agreement, we walked separately.

PERHAPS FRANK HESS really was a good administrator—he certainly hadn't got the Air and Space position for his stage presence. His holo image sheltered nervously behind the podium. He stared straight ahead, probably at a teleprompter. This would have looked all right on flatscreen, but on HV everyone isn't viewing you from the same angle; Hess appeared wooden and lifeless. The whole HV eidolon shrank as the camera drew back to display doll-sized reporters in a tiny auditorium. Someone off camera rapped for attention, and the noise in the room died down. But then there were ten seconds of dead space before Hess could bring himself to speak. I felt vaguely embarrassed, and looked across to see what sort of impression he was making on the Russians. Even Valentina was frowning.

"Uh, ladies and gentlemen," Hess finally began, "the Department of, uh, Air and Space has concluded that it would be proper to release some previously classified information regarding the Third American Expedition to Mars. This information may have some bearing on the, uh, fate of the Soviet personnel involved in the recent crawler accident." He swallowed uncomfortably. "Now, I am sure that all of you representatives of the media and you people at home are well aware that DAS and its predecessor NASA have since the beginning of the space program in the last century, operated with, uh, maximum public exposure. In this, our policy has been much in contrast with that of the, uh, Soviet Union. With very few exceptions, American military applications of astronautics have been implemented not by DAS, but by the Department of Defense."

Hess paused and took a sip of water. I glanced around the common room. Save for two or three proverbial cool heads, everyone looked nervous. Pogodin was visibly working himself up into a proper fit of indignation.

"However," Hess went on, "it would be foolish to deny that many of the projects under DAS jurisdiction could be turned to military application. In a certain sense even, uh, New America is among these. The gardens and ice mines there give the promise that someday, uh, New America might become the first self-sustaining settlement on Mars. New America's location near deposits of ice and, uh, certain other minerals also makes it suitable for the manufacture of fuels, reaction mass, and various pieces of equipment with possible military value.

"On the other hand, uh, New America is peculiarly vulnerable to attack. You probably recall that the huts at Armstrong Base which sheltered the First and Second expeditions were made chiefly from rigid frameworks covered with soil. These proved quite successful, but they were time-consuming to erect and limited in size. The Third Expedition established New America base at a different site, with much larger but also more vulnerable inflatable domes used almost exclusively."

I began to suspect what was coming, and I looked around to see whether anyone else did. On the American side of the aisle, Borman had clenched his hands into tight balls. Across the way, the enigmatic Valentina had not changed her expression, but Pogodin no longer looked indignant. His face had reverted to its standard frown as he waited for another cue.

Hess drank more water. "Now, it will be recalled that the current Iraq situation began to develop roughly simultaneously with the landings of the Third American and Soviet Mars Expeditions. It would be childish not to admit that the Middle Eastern situation had suggested some chance of war. Also at that time the Korean crisis, happily since resolved, was at its height. While the Chinese do not have, uh, manned deep-space capability, it would be well within their capacity to send a very accurately guided robot bomb to Mars. They might wish to do so if they felt, for instance, that otherwise an American Mars colony might hold the last people alive in the Solar System.

"Now, such a speculation may sound alarmist to you. I confess that it, uh, strikes me much the same way. Similar concerns, however, were expressed not by our own people at Air and Space, but by the Department of State. And the President and, uh, also the NATO Council felt that precautions could be taken with what seemed at the time to be little inconvenience. Thus, a ciphered message was sent to the Third Expedition before it landed, directing it to establish New America not at the announced primary site, but at the third alternate site, some five hundred kilometers away. The, uh, implications of this unannounced change for the crew of the Soviet crawler should be obvious."

There was a brief but total silence in the common room.

Hess continued speaking for another ten minutes or so, pointing out that analyses of television transmissions and radio traffic would eventually have given the game up to the Soviets, and strongly hinting that by now Soviet intelligence must have been well aware of what was going on, and that hence it was really their fault for not having relayed the information to the Soviet expedition; for the Academy of Sciences denied knowing anything about the change. The real site of New America was well within the range of the Marsokhod, but on finding the American primary landing site empty, the crew would have no idea which way to go.

The Secretary spoke optimistically about plans for reprogramming a relay satellite so that it could be received by a suit intercom (Mars of course has no ionosphere to reflect waves beyond the horizon, so neither New America nor Brezhnevsk could do anything directly) or of rebuilding one of the short-range American Mars scooters so that it could travel to the primary site and meet the Marsokhod. Perhaps these plans sounded reassuring to the people down on Earth. Most of us on Signal Station had enough technical training to give them an accurate assessment.

I'm not sure whether Valentina was avoiding me after the broadcast—because, mostly for motives I am ashamed of, I was avoiding her. Late that evening I found my copy of our manuscript dumped on my cot.

The next day Orlov and I continued where we had left off, making infinitesimal adjustments to the reflector unit. The work went along all right, but neither of us could find much to say to the other. I felt vaguely guilty, and therefore defensive. I knew this was a stupid reaction—I, after all, had nothing to do with the case of jitters whose outcome was not embarrassing DAS, and which might end up killing the five Russians. But my intellectual knowledge wasn't a great deal of help. Western individualism does not wipe out gut feelings of collective guilt, though perhaps it tones them down.

Orlov must have had his own problems, magnified by the Soviet emphasis on *kollektivnost*. On Mars as everywhere else, the Russians were stretched thin. They used baling-wire-and-chewing-gum improvisations and took fear-

ful risks. Their failure rate was high, but a more cautious approach would have left them far behind the United States. Losing the only crawler on Mars was bad enough. Having to run to New America was worse. Running afoul of DAS's little stragem was the last straw. It was like coming crawling to your neighbor for a loan only to have him turn you down. The only good part of the experience would be that you could turn your shame into rage.

Not that Orlov was precisely enraged with his American co-workers yet. But the station held Russians like Pogodin as well as Russians like Orlov. Things were getting strained.

In the background, of course, there was still the Iraq crisis. I continued to wonder how much longer Signal Station could last. Perhaps the U.N. would inherit it. In a year it might be peopled by Swedes and Irish, Nigerians and Vietnamese.

CONTROL VARIED THE NEWSCASTS they beamed us according to a fixed cycle. That evening we watched the *Poslednie izvestiia* from Moscow, easily the dullest and least informative program on the rotation. The snippets of tape on Iraq and Mars, buried as they were among the hosannas to the current Plan, increased my depression.

I repented my moral cowardice and now wanted to speak to Valentina. So of course she had disappeared. I kept glancing across the aisle and backward in the hope that she would arrive late. Eventually I did catch sight of her at the very back of the room. As the newscast ended, I moved quickly up the aisle and across the invisible line, and cut her off before she could escape.

She anticipated my question and shook her head. "I know the arguments haven't changed," she said, "but I simply cannot." She looked down at the floor. "In fact, I wonder whether it would not be better to call the whole collaboration off now."

"If you really think that is best," I said. "But do you?"

She hesitated. "We still have a common first draft, and I'm sure neither one of us wants to make copyright difficulties for the other. It might in fact be more interesting to have two rather different final versions published."

"More interesting, perhaps," I said, "but not what we'd planned."

Valentina gave a little shrug. "Well then, let us wait. If the Mars situation...straightens out, and if the Stockholm talks make progress, things may look better in a few weeks, though I have my doubts."

"All right," I said. "We'll wait."

I ate quickly, climbed up the ladder to the residential level, and went back to my room. My roommate was off somewhere, and I had the cubbyhole to myself. I flopped down onto my cot. Lying flat in lowered gravity was a distinct if minor pleasure. I briefly considered climbing all the way to the zero-g section at the hub, but I decided I did not want to make the exertion. Wallowing in depression was more like it.

I was reasonably certain I could finish a publishable version of the novel by myself. But it would not read all that differently from my few short stories, nor from two or three hundred other titles issued each year. A full collaboration, on the other hand, might be something unique. It wouldn't be so much better than anything else (neither Valentina nor I had the experience, and perhaps not even the inherent talent), but it would stand out because there wouldn't be anything exactly like it. A simile occurred to me, and since I was in this literary mood I elaborated on it. Actually, the book Valentina and I

Patrick L. McGuire

wanted to write was rather like the Signal—not so bright in itself (there had long been industrial and military lasers more powerful than ours, though not capable of such long-sustained operation), but appearing in a part of the spectrum which was otherwise dark.

Having made my comparison, I contemplated it. The main flaw seemed to be that it failed to embody either the coherence of the Signal or the precision with which it was directed. A novel was more like a broadcast. The laser transmission, on the other hand, would be a fantastically narrow beam which widened appreciably only over the vastness of interstellar space. Anywhere within the inner Solar System, all its power would be confined within a region that you could walk across in a few hours. *Anywhere* in the inner Solar System? I leapt from my cot and hit the intercom button.

IT SHOULD HAVE BEEN more obvious than it was, or so it seems after you've seen the flatscreen film the crawler crew made. It was taken in early evening, when the pinkish Martian sky, in its contrary fashion, was beginning to fade out into blue toward the edges. You can't see the Earth and Moon on the film, though I'm told that on the spot you could just barely make them out, and could easily discern their thin crescents with a small telescope. Instead, what you see is a pure violet point, brighter than Venus looks from Earth. It resembles an aircraft's running light, though it is not visibly moving. Like an airplane light, it blinks. After you watch a moment, you realize it's blinking in Morse code. If you know Cyrillic-alphabet Morse and know Russian, you can read what the 'star' is telling you.

Simple enough—but no one was really in the habit of regarding the unaided human eye as a receiver for interplanetary messages. Even so, I wasn't the only person who thought of it. I myself know of four people Earthside who got the idea sooner and were still trying to push it up through channels. I think what I really deserve credit for is the sweat I put into the implementation. The laser wasn't yet accurate enough for 82 Eridani—which was all right, since if it had been the beam might have been tight enough to miss the crawler crew entirely. They'd wandered a bit away from the American primary site. The real trouble was that it was aimed in the wrong direction, at 82 Eridani, and it had only a limited ability to pivot. For an analogy, think of one of those old shore batteries that came to grief because it could not swing around to meet a land attack. Fortunately the projector, unlike a shore battery, was not attached to bedrock. We had to stop the spin on the Station and reposition the entire thing. Not easy, but both DAS and the Soviet Academy of Sciences sent up shuttles with extra equipment and personnel.

Commercial one: *Ovan* is now available in English and Russian versions. The censors didn't even chop up Valentina's text too badly—thanks, I suppose, to the spirit of international *sotrudnichestvo* which now seems to be back with us for a while.

Commercial two: Valentina and I are now working on *Ovan Discoverer*, this time by the less convenient method of faxing each chapter's draft from Chicago to Leningrad and back. The damned Soviet postal censors hold up each delivery by a minimum of three days, but so far they've let everything through. If this amiable mood of *mir i druzhba* lasts until June, and if Valentina can get a visa, we intend to meet in Helsinki for the final polishing. *Ovan Discoverer*. When it comes out, buy it.

A.A. Whyte

The Aleph:

A Seasonal Microcosm

Given below is a listing of all known original (and revised) Science Fiction and Fantasy novels, collections and anthologies, with annotations (where space permits) announced as American publications for adults during July, August and September, 1977

ANTHONY, Piers

A Spell For Chameleon

Ballantine-del Rey/September/\$1.95

[Xanth was an enchanted realm where magic ruled, a land of centaurs, dragons, basilisks, wizards... Every living creature (even plants) had its own special spell.] Indeed, some demonstration of magical ability was a prerequisite for citizenship. All those who failed the test were exiled. Such was the fate in store for young Bink, of the North Villa, when he came of age only to find that he did not seem to have any talent for enchantment. And yet, there were those, both Good and Evil, who believed that Bink did have a very special gift, one that might well transform the very way of life for all in Xanth. A light-hearted change of pace from this almost always interesting author.

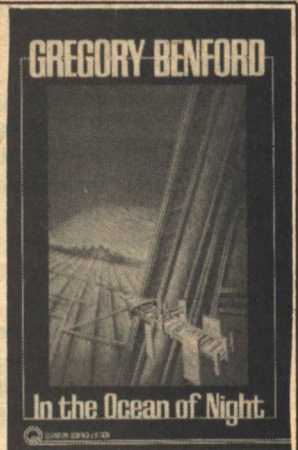
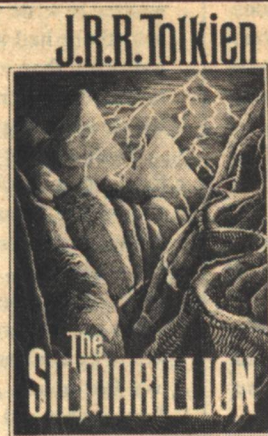
ASPRIN, Robert

The Cold Cash War

St. Martin's Press/September/\$7.95

It is early in the morning of the next day at the WorldCon. 'Round a campfire of the mind, a few are gathered. Whose voice rings out? It is a lean, black-clad stranger, with dangerous eyes. He sings harshly, of fearful deeds, yet to be performed. There are many verses to his song. Yes, it is Yang, the Terrible, Dorsai!—in his other existence, Robert Lynn Asprin, [expert in the martial arts and cost accountant for a major international conglomerate.] In this first novel, his first published fiction, [organized and highly regulated warfare—reminiscent of medieval tournaments but with modern weaponry—is waged to decide competition for markets. Asprin speculates "how today's mercenary armies and multinational corporations might take a shot at taking over the world and making national governments and their armies obsolete."—Ben Bova in *Analog*, where an excerpt

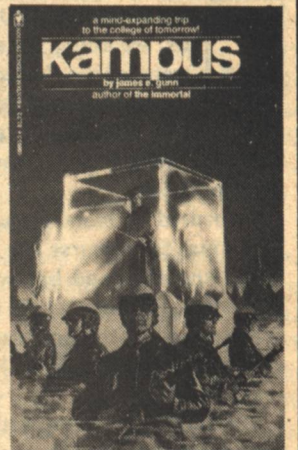
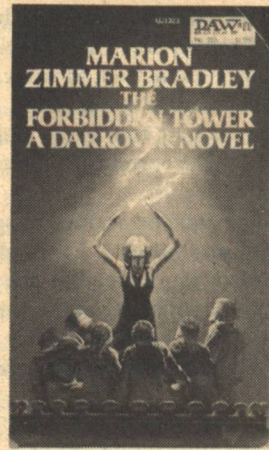
70 GALILEO



THE MARTIAN INCA



A NOVEL
Ian Watson



appeared in the August issue.]

BARRETT, Neal [Jr.]

Aldair-Master of Ships

(Aldair series 2)

DAW/September/\$1.50

Long after the Darkness, beasts walked as men and did not know themselves for what they were. [Where was humanity? What legacy did true mankind leave to its manlike descendants that they must relive our past?] These are questions that the turbulent events of *Aldair In Albion*, the first book in this new series, only taught our hero to wonder. Aldair (who, if truth be told, is something of a pig) must strive to survive in a world that is a grotesque replica of the later Roman Empire where the patrician caste are lizard-men. Barrett, whose eighth novel this is, has quietly emerged as one of the most convincing tellers of improbable events in SF.

BAYLEY, Barrington J.

The Grand Wheel

DAW/August/\$1.50

The organization that controlled criminal activity on the human-run planets was a small-time operation compared to the galactic mafia. Now the syndicate wanted in on the larger action. So they made gambler Cheyne Scarne an offer he couldn't refuse and sent him to be [humanity's own player in a game in which nobody knew the value of the cards and the rules were infinitely variable!]

BENFORD, Gregory

In the Ocean of Night

Dial (James Wade)/August/\$9.95

A Quantum Science Fiction Novel

SF Book Club/Fall/\$3.50+

2011 AD: The first contact with non-human

intelligence occurs when an alien space probe enters the solar system. It is a machine with an independent intellect. Who built it? With what purpose? Is it invader or merely explorer? Should the public be informed? One man establishes communication and it is he, not the security establishment, who makes the ultimate decision. Since the seed story on which this novel was based was published in 1972, the author has worked many changes. The treatment is infinitely more sophisticated, the narrative more complex. Benford is a professor of physics at the University of California, specializing in research on controlled thermonuclear fusion. He is perhaps the only practicing scientist writing SF to have consciously developed a 'contemporary' style. After 12 years of contributions to the field, this ambitious novel is his bid for recognition as a major literary voice.

BRACKETT, Leigh

The Best of Leigh Brackett

edited by Edmond Hamilton

SF Book Club/July/\$2.98+

Ballantine-del Rey/September/\$1.95

BRADLEY, Marion Zimmer

THE FORBIDDEN TOWER

(A Darkover Novel)

DAW/September/\$1.95

In a sequel to *The Spell-Sword*, Marion Zimmer Bradley tells of four people (three Darkovans and a Terran) who united to discover the secrets of Comyn matrix power despite the peril, and whatever the consequences.

BUDRYS, Algis

Michaelmas

Berkley-Putnam/July/\$7.95

Expanded from version serialized in *F&SF*.

The Aleph

CARRINGTON, Leonora

(F)

The Stone Door

St. Martin's Press/September/\$7.95

A bizarre, phantasmagoric fantasy "built in layers like a Chinese puzzle," having to do with love, the Zodiac, and the Kabbalah, among other strange things, by the noted Surrealist artist and author of *The Hearing Trumpet*.

CHALKER, Jack L.

Midnight at the Well of Souls

Ballantine-delRey/July/\$1.75

[The Well World was created around a great computer brain, on which 1560 different races are arranged in 'nations,' each having its own particular environment. There is a legend that at midnight at the Well of Souls—the control center of the world—anything can happen. Skander, an evil archeologist and his equally vicious student/assistant believe that if they can reach the Well, they will become lords of the Universe. It seems to be the lot of Nathan Brazil, supposedly just an adventurous space captain, to stop them. But who is he really? And just how old is he? And can he outrace Skander to the Well, abetted by the strangely transformed beings that everywhere abound? And just what will happen if he should succeed... and, at last... remember?

CHERRYH, C.J.

Hunter of Worlds

DAW/August/\$1.75

Previous edition from SF Book Club. This is first trade publication.

The third novel by the author of *Gate of Ivrel* and *Brothers of Earth* is set in a far-future spacefaring society. Chief in a complex hierarchy of many humanoid races are the ruthless Iduve. Three representatives of dissimilar cultures are compelled by these pitiless masters to participate in the apprehension and execution of one of their own kind, whom the Iduve regard as a traitor. To accomplish their ritualistic vengeance, the Iduve oblige the trio to unite in painful psychic bondage and are not above destroying an entire planet in order to achieve this single-minded end. As predicted (see *Galileo*, No. 2), Ms. Cherryh is a nominee for the 1977 John W. Campbell Award. The reader may find the glossary of 'foreign' (i.e., alien) terms a welcome feature.

COVERTITO, Bill

The Rombella Shuttle

Major/June/\$1.50

[Invading aliens boost Earth's birth rate by increasing the speed of gestation to three months and adulterating the food and water supply so humans will breed like rabbits. The Earth is then threatened with destruction because there is not enough food, water and living space for so rapidly expanding a population.] First novel by a professional bookseller presumed (by the publisher) to know from experience just what kind of book will sell.

deCAMP, L. Sprague

[&] PRATT, Fletcher

Tales from Gavagan's Bar

Owlswick Press/July/\$11.00

cover & frontispiece: Tim Kirk
interior illustrations: Inga Stevens Pratt

Taverns and other establishments for drinking and socialization are favored settings for many a writer of fantasy. There is the "White Hart," of course. Poul Anderson's "Old Phoenix," Jorkens's

Drew Whyte

club (Lord Dunsany) and more recently, Callahan's Crosstime Saloon, to name but a few that come readily to mind. Among connoisseurs, Gavagan's (rhymes with 'a pagan's') is one of the best regarded. The chronicle of the "dubious events" recounted or transpiring in the premises so ably presided over by the talented Mr. Cohan have been unavailable (to all but the most assiduous) for nearly a quarter of a century. The present volume is also of interest in that it contains several stories not previously collected.

DIAMOND, Graham

The Haven

Playboy Press/August/\$1.50

[40,000 years from now, humanity has been reduced to a small group of superior beings capable of communication with mammals and living in an enclave called The Haven, the last remaining bastion of civilization on Earth. Suddenly, from out of the endless forest, an army of cunning, vicious wild dogs in league with a horde of vampire bats comes to fulfill an ancient prophecy and destroy The Haven.]

DISCH, Thomas M.

(C)

The Early Science Fiction Stories of Thomas M. Disch (1963-1966)

Gregg Press/June/\$13.00

Bound together for the first time here are two early works—a collection and a full-length novel. The former appeared, with slightly varying contents, both in England and the U.S. as *102 H-Bombs*. Among the stories in the British edition was the novelet "White Fang Goes Dingo," later expanded to form Disch's first book, *Mankind Under the Leash*, half of an Ace Double-Novel. The latter is included here as *The Puppies of Terra*, the author's original (and preferred) title. Thus, both versions, original and revised, are conveniently at hand, enabling a scholar to compare the two, as Robert Thurston has done in his thirty-two-page introduction. Another current (third series) Gregg selection combines Theodore Sturgeon's "To Marry Medusa" with its novel-length version, *The Cosmic Rape*, allowing Samuel R. Delany to comment usefully in his introduction.

DowDELL, Del

Warlord of Ghandor

DAW/August/\$1.50

In 17-century Ireland, master swordsman Robert, of clan Dowdall, is leading his kinsmen to help repel the Puritan invasion of his homeland, when he steps through a "space window" and emerges on another planet. Instead of Cromwell's men, he finds himself combatting [beastmen and alien warriors and soon he becomes the leader of a primitive race, rescuer of a lovely princess, champion of embattled cities, etc.] Although it may appear unlikely, Del DowDell is really the author's name. He has plans for his hero (modeled on a forebear) to undergo many further adventures on Ghandor and admires Edgar Rice Burroughs, whom he hopes to emulate, for his "high degree of integrity, morality and heroic flair."

FAST, Jonathan

The Secrets of Synchronicity

NAL Signet/July/\$1.50

[Steffin-Dae should have died on Slabour, like all good Diggers do. After a few years of grubbing for Creelium—the most precious metal known to man—his lungs should have been so full of red dust that there was no room left for air. But Steffin got lucky or maybe it was just his destiny. He escaped, stumbled on the key to the universe and became the most dangerous man in the inhabited galaxies!]

This is the first novel by a new writer (SF debut in 1975) who is the son of Howard Fast, himself no stranger to the field, and incidentally, the model for Josh Ace, the sympathetic lover in Erica Jong's best-selling *How to Save Your Own Life*. Another, provisionally titled *Mortal Gods*, will follow in 1978.

FERRO, Robert

(F)

THE OTHERS

Scribner's/September/\$7.95

Off-trail fantasy in which reality is seemingly suspended. Peter Conrad, invited to recover from an illness aboard the yacht of friends, encounters instead five strangers, among them [two people who have neither country, names, nor specific sexuality]. A dreamlike atmosphere prevails. Possibly this may be an allegory similar to *Outward Bound*.

FINNEY, Patricia

(F)

A Shadow of Gulls

Putnam/August/\$8.95

A.D. 113. The first of a series of novels set in ancient Ireland and originally written when the author was seventeen introduce us to such Celtic figures of legend as Cuchulain, Queen Maeve, and, of course, Deirdre of the Sorrows. Our hero is imaginary: he is Lugh MacRomain, harper, [bastard son of a fearless Roman centurion and a Druid princess.]

GOLDIN, Stephen

Assault on the Gods

Doubleday/August/\$6.95

Captain Ardeva Korrell and her crew of merchant spacemen, stranded without a ship on the backwater planet Dascham, are attempting to drown their misfortunes in a local tavern. When one of the company, in a bit of drunken invective, curses the indigenous powers-that-be, he is [struck dead by a celestial lightning bolt and denounced by an alien angel delivering a proclamation]. Somewhat taken aback, and smelling a rat, the Captain recovers to mount a scruffy expedition in a hazardous attempt to storm the stronghold of the native 'gods.' Goldin is probably best known at this time as the writer chosen to complete Doc Smith's "Family D'Alembert" series, of which four have now been published. This is his first hardcover novel.

GUNN, James E.

Kampus

Bantam/July/\$1.75

"Where has learning fled?" A professional educator, Prof. Gunn, appears not altogether at ease when contemplating certain developments on the academic scene during the turbulence of the preceding decade. Now, [1984 is the good old days. On America's campuses, professors hawk their courses, dozens of political groups compete in violence, and computer dating means having sex with a computer.] Senior Tom Gavin, expelled from a mid-western university when he is caught in a crossfire between administration and his fellow radicals, wends his way westward in a nightmare *wanderjahr*. Keywords: enclave... drug culture... Skinner... revolution... Reich... sex... commune Marcuse... McLuhan. cf: *Giles Goat-Boy* (John Barth), *The Glass-Bead Game* (Hermann Hesse), *Final Solution* (Richard E. Peck) and, maybe, Isaac Asimov's "Profession."

HANCOCK, Niel

(F)

Celix Stay

[Circle of Light—series #3]

Popular Library/August/\$1.95

[Welcome to the enchanted twilight world of

Atlanton Earth]—This series of four books forms a continuous narrative which will culminate with the publication in October of *Squaring the Circle*. The covers by Gervasio Gallardo do not misrepresent the contents. Even in the direst moments, there is a gentleness that reminds one of C.S. Lewis' Narnian books. The tone is somehow too cozy to be able to think of the series as an epic fantasy, but there is a quest, battles, enchantments and peril aplenty for our loveable heroes: Bear, Otter, and Broco, the Dwarf. There are two sisters, one good, one evil and it all takes place—but I see I've run out of space. More next issue.

HERBERT, Frank

The Dosadi Experiment

[sequel to *Whipping Star*]
Galaxy/May-June-July-August
Berkley-Putnam/September/\$8.95

When asked for a capsule description of his new novel, Frank Herbert instantly replied "It concerns an experiment carried out on an isolated group of humans without their knowledge or consent." [Centuries ago, humans and some of the frog-like race of Gowachin were imprisoned on the planet Dosadi as part of a social experiment by the Gowachins. Placed under the most horrible, overcrowded conditions, both races formed a totally cunning and vicious society, an order so fearsome that the Gowachins now want to destroy Dosadi. Jorg X. McKie, the spy-hero of *Whipping Star* is sent to investigate and is captured...] (Hope *Galaxy* will be around to finish the serialization—and long after!)

HODGSON, William Hope

(F)

The Dream of X

14 color plates by Stephen Fabian
Donald M. Grant/June/\$15.00
(variant, short version of *The Night Land*)

Don Grant knows no peer for the production of beautiful books. No one takes more joy or care in their actual appearance. Every title is an instant collector's item. These are simple facts. The present item may in years to come be one of the most treasured, especially for the full color illustrations by Steve Fabian (probable winner of this year's Hugo). *The Night Land* is a strange, unique visionary fantasy which some find impenetrable and others regard as a masterpiece. Sam Moskowitz, ever-diligent in uncovering lost works by forgotten masters, tracked down what may be the sole remaining copy of an alternate version, copyrighted in 1912, and published by the author. 2,500 copies of this 7 x 10 book have been printed on delicious-sounding 80% Monadnock Caress paper, of which 300 [have been earmarked for a special deluxe binding and slipcase, numbered and signed by the artist at \$25].

HOSKINS, Robert

Tomorrow's Son

Doubleday/September/\$6.95

After several years as an editor, Hoskins has resumed his writing career. This, his fourth published novel, resembles in subject matter the one which immediately preceded it, *To Control the Stars* (see *Galileo* #3). The status-bound human society of the 23rd century has spread to the stars but Earth is predominant. That is how the "Firsters" would like things to remain. The efforts of two high-borns who think otherwise to change the situation are told in alternating chapters. On backward Karyllia, Clay Holland, ostensibly a priest in an Earth-created local religion, works undercover to improve the native lot which back on Terra, his father, David, secretly struggles to create a new race of androids. Since the demise of *Infinity* and the abortion of *Gamma*, several anthologies

edited by Mr. H. have been languishing in inventory. (For one that made it, see this issue's anthology section.)

HOWARD, Robert E.

THREE-BLADED DOOM

(C)(F)

Zebra/June/\$1.50

MARCHERS OF VALHALLA

(C)(F)

(with "The Grey God Passes" & "The Thunder Rider")

Donald M. Grant/June/\$15.00

11 color plates by Marcus Boas

The Hour of the Dragon

(F)

Berkley/August/\$1.95

The Authorized Conan—Volume One, edited by Karl Edward Wagner. Illustrated with the original *Weird Tales* illos. This is the book formerly published by Gnome Press, Ace & Lancer as *Conan the Conqueror*. (Original text restored.)

The People of the Black Circle and Other Stories

(C)(F)

Berkley/September/\$1.95

Both of these have posters included.

JANIFER, Laurence M.

Survivor

Ace/August/\$1.50

Title in manuscript: "Knave"

Janifer, who has been writing SF for nearly 25 years, has many short stories and novels to his credit. Recent tragic personal events have, it is good to know, apparently not slowed him down.

[Cub IV was a beautiful planet—it had a reputation as being one of those most peaceful and favorable planets for human colonization—but it wasn't. There was an alien intelligence on Cub IV,

a malicious intelligence that would not rest until every human had been eliminated. It was a death trap... and Gerald Knave found himself with the job of saving what was left of the human colony, while keeping himself alive in the process. He would have to use all his survival skills and more, to perform that miracle.]

JONES, D.F.

Colossus and the Crab

[3rd in a series]

Berkley/August/\$1.50

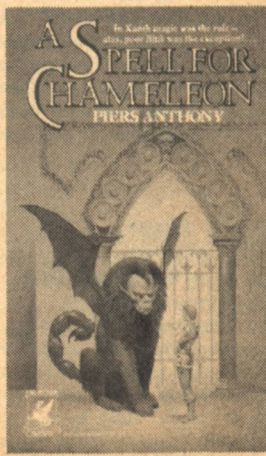
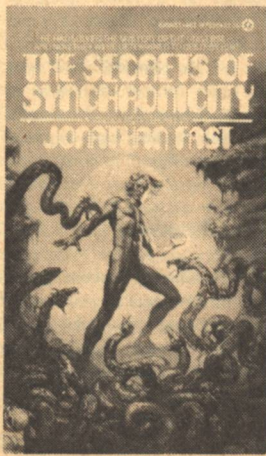
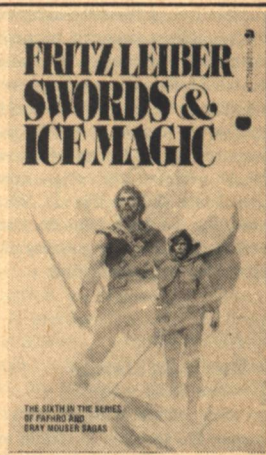
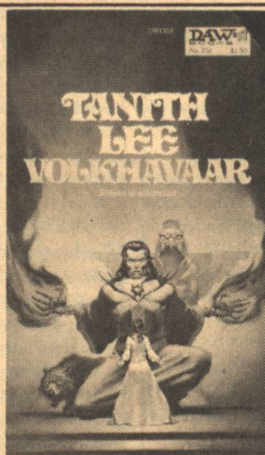
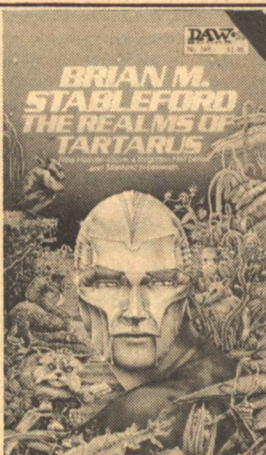
Whether or not Jones originally conceived of *Colossus* as a trilogy or was merely encouraged by the reception of the film made from the original book, I do not know, but certainly none of his other works has had a remotely similar impact. Volume I told of how the ultimate computer was constructed for defense purposes, but instead became supreme lord and master of the planet. In the sequel, its unfortunate creator, Forbin, who is the unwilling mediator between Colossus and humanity, learns of the existence of alien intelligences and strikes an infernal bargain. Has one form of tyranny been exchanged for another? [Will Forbin turn out to be the universal Judas or can he prevent these strange beings from taking their horrendous tribute?] And will this be the end of the series (or just the human race?)

JONES, Douglas C.

Arrest Sitting Bull

Scribner's/September/\$8.95

Another small-focus limited uchronia by the author of *The Court-Martial of George Armstrong Custer* (due shortly from Fawcett in paper and as a 3-hour TV special in the Fall). Jones returns to the same setting and era to speculate on the results of a confrontation that never took place. A mini-mini



genre has been birthed. Next year: Wounded Knee.

KAPP, Colin

The Chaos Weapon

Ballantine-delRey/August/\$1.50

UK author Colin Kapp's fifth novel is set long after the events depicted in his 1972 *Patterns of Chaos*. The Terran Institute for the Study of Chaos Phenomena is alarmed. [Seemingly without explanation, people in high positions are suddenly being eliminated during outbursts of what appear to be natural disasters: a solar flare, a meteorite strike, a tachyon storm—even an avalanche.] Some unknown enemy has constructed a device that is able to distort probability. Space-Marshal Jym Wildheit is sent out to track down the location of this "Chaos Weapon." Teamed with him is a strange being that exists in several dimensions simultaneously and an adolescent Sensitive with paranormal powers of prediction. Matters are not simplified by their discovery that the enemy and weapon they seek are nowhere to be found in *this* universe! (Currently being serialized in the new British SF magazine, *Vortex*.)

KOHOUT, Pavel

White Book

translated from the Czech by Alex Page
Braziller/August/\$8.95

The new focus on human rights has produced its heroes, one of whom is Czech author Kohout. *White Book* is a satire on repression with an experimental style. Adam Juracek, a "Professor of Drawing and Physical Education at the Pedagogical Institute in K." (incidentally, the central character in Kohout's play *Poor Murderer*, recently produced on Broadway) defies the law of gravity through will power alone and begins to walk on the ceiling, thereby incurring instant bureaucratic censure. The government declares a national emergency. Juracek is turned over to a succession of psychiatrists; he is tried, sentenced, and eventually emerges in the year 2000, pardoned at last, but able only to recite his identification number and orthodox Newtonian physical laws. Levitation is no more tolerable by the state that was the Prague 'springtime' of 1968, but someday, perhaps...

LAUMER, Keith

The Wonderful Secret

Analog/September-October

This is a 30,000-word novella which has been split in two parts for reasons of convenience. An unremarkable Earthman is selected by a superior alien to be the subject of an experiment to determine human potential. Not, it would seem, a reader of *Analog*, the alien is surprised when our hero transcends primate savagery in a dazzling display of newly acquired superpowers. Good to see Mr. Laumer back at his typewriter.

LEE, Tanith

(F)

Volkhavaar

DAW/July/\$1.50

Cosmic forces contend through the personae of two unequal human adversaries in this new fantasy by the author of *The Birthgrave* and *The Storm Lord*. Volkhavaar is a power-mad magician who, in order to ensure his domination of the kingdom, has sold his soul to an evil demiurge. He is opposed only by Shaina, a slave girl who has obtained the aid of a rival deity in her quest to regain a lover lost through the cruel whim of the dark enchanter. Ultimately, a world is at stake and even death will not resolve the struggle.

LEIBER, Fritz

(C)(F)

Swords and Ice Magic

[Fafhrd & Grey Mouser—series #6]

Drew Whyte

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Ace/July/\$1.50

Included in this new collection of stories about the land of Newhon, the first to be published in seven years, are the recent *Cosmos* serial "Rime Isle" and (I believe) "The Frost Monstreme," "Under the Thumbs of the Gods," "The Sadness of the Executioner," and "Trapped In the Shadowland." Leiber has described his two inimitable characters as "the two greatest swordsmen ever to be in this or any other universe of fact or fiction...two comrades to the death and black comedians for all eternity, lusty, brawling, winebibbing, imaginative, romantic, earth, thievish, sardonic, humorous, forever seeking adventure...fated forever to encounter the most deadly of enemies, the most fell of foes, the most delectable of girls and the most dire of sorcerers and supernatural beasts and other personages." All of which does not leave one much to add except that it is my understanding that Stuart Schiff of *Whispers* reknown is planning to publish a hardbound illustrated edition...real soon now(?)

LORD, Jeffrey

(F)

The Torian Pearls

[Richard Blade series, No. 25]
Pinnacle/September/\$1.50

Blade's latest dimension is [a sinister island surrounded by endless swamps]. Having demonstrated his prowess in combat, he is invited to join a tribe of warriors who have been forced to leave their homeland because of a flood. At once he must defend them from [dreaded flying reptiles] and a rival lot of brutal barbarians who have never been defeated in battle. A note in *Locus* says that Ray Nelson is the author of a forthcoming adventure. I don't know if Roland Green is responsible for this one.

LYLE, Peter

(F)

Rolind of Meru

Avon/July/\$1.25

Can we have archaic and read it, too? My apologies, I don't even think that's original (at least, I hope it isn't). It's just that some books are harder to write about than others, even when the publishers have been kind enough to send an advance copy. Since this is not a review, perhaps it will suffice to say that this is the least fantastic of the batch of recent fantasies. No monsters, save the human kind. In a medieval kingdom, rotten as the state of Denmark, a young prince struggles as naanfully as his fifteen years will permit to avoid fulfilling the prophecy that says he will kill his twin brother. No use. Poor Rolind! Poor Dels! Poor... Well, that's *Li*(or is it all a clever plot?) I don't know anything about Peter Lyle, except that he is really somebody else.

MARTIN, George R.R.

(C)

Songs of Stars and Shadows

Pocket Books/July/\$1.75

The nine stories in George ("Railroad") Martin's second collection (already!) were written from 1971 to 1974 and published from 1973-1976 in a variety of markets. Martin is one of the new SF elite—young, hard-working, ubiquitous, popular from the very start of his career, well-versed in science and the arts and seemingly destined, like Asimov, Clarke, Heinlein, Niven, and maybe John Varley to have every word he ever wrote between the covers of a book. Included are "This Tower of Ashes," "Patrick Henry, Jupiter and the Little Red Brick Spaceship," "Men of Graywater Station" (written with Howard Waldrop), "The Lonely Songs of Laren Dorr," "Night of the Vampires," "The Runners," "Night Shift," "...for a single yesterday," and Hugo nominee "And Seven Times Never Kill Man." In a thoughtful introduction (to coin a

phrase), Martin tells a bit about himself, reveals the sources of his inspiration and confesses to being an abashed romantic, claiming his favorite theme to be "...reality's repeated search-and-destroy missions against romance." Several of the stories are set in the same background universe as his forthcoming first novel, *Dying of the Light*.

MERWIN, W.S.

(C)(F)

Houses and Travelers

Atheneum/August/\$10.00; \$6.95 paperbound

Fables...parables...myths...fairy tales... "metaphors, puns, surrealist visions"... prose poems [for admirers of Kafka and Borges] by the distinguished poet whose previous such collection was *The Miner's Pale Children*.

MOORCOCK, Michael

(C)

The Bane of the Black Sword

The Saga of Elric: Volume V
DAW/August/\$1.25

The Cornelius Chronicles

Avon/August/\$2.95

Contains: *The Final Programme* [reissue]; *A Cure For Cancer* [reprint]; *The English Assassin* [reprint]; *The Condition of Muzak* [first U.S. publication]. Postponed from March (see *Galileo* No. 2) due to addition of *The Condition of Muzak*.

The Swords Trilogy

(F)

Berkley/August/\$1.95

contains: *The Knight of the Swords*; *The Queen of the Swords*; *The King of the Swords*.

MORRESSEY, John

Frostworld and Dream Fire

Doubleday/July/\$6.95

SF Book Club/November/\$1.98+

The latest novel by the author of *Under A Calculating Star* is [the story of an alien pilgrimage, the quest of one lone being—not quite human, not quite animal—to save his race and history from extinction.] Trader Seb Dunan comes to a bleak, frigid world in search of priceless gorwol pelts. No one can track down these elusive creatures but the Ohnla, strange native tribesmen, who become fully human only at puberty. Dunan learns, however that the entire race has [been wiped out by a plague of unknown origin, with the single exception of Hult, the last Ohnla. Demand for gorwol pelts is great; Dunan's superiors are implacable. He is not about to give up. But Hult has an even stronger motivation, to find others of his kind, off-planet, where the legend has it that they were abducted many years before.]

MURPHY, Shirley Rousseau

(J)

The Ring of Fire

[1st of a series]

Atheneum/September/\$7.95

[This is the first of several books for young people that will deal with a problem time on the planet Ere. Two Children of Ynell, Thorn and Zephy face great peril because of their extrasensory powers. In Cloffi, their home country, such Children are killed. Agents of other nations seek to use them for evil purposes. With the help of an older man, Anchorstar, and a strange race of godlike beings, Thorn and Zephy seek to free others of their kind and flee the planet.] By the author of *The Grass Tower* and *Silver Woven In My Hair* [for ages 10-14, grades 5-9].

NELSON, R. Faraday

The Revolt of the Unemployables

Anthelion Press/June/\$2.95 (paper)

[... a revolution begins when an alcoholic is termed unemployable]... supposedly features the

same protagonists as Nelson's Laser novel, *Then Beggars Could Ride*... I was hoping the publisher would tell me more, but...

NIVEN, Larry (&) PORNELLE, Jerry

Lucifer's Hammer

Playboy Press/July/\$9.95

Postponed from June, see *Galileo* #3.

PARRY, Michel (&) RUSOFF, Gary

Throne of Fire

[Boaz trilogy: Volume 2]

Popular Library/June/\$1.50

Further revelations from the "Giradoux Manuscript," the ancient document of which the initial volume of this narrative version was *Chariots of Fire*. [Now the South American native chieftain who became the gods' first human deputy continues the saga of the great war between the space-gods, as two breeds of alien creatures fight for the Earth, using every deadly weapon, every cunning wile they can muster.] The series will be completed with Rusoff's *Spears of Fire*, to be published in November.

PONS, Maurice

(F)

The Seasons of the Ram

translated from the French by Frances Frenay
St. Martin's Press/July/\$7.95

A decidedly off-beat allegory that may not be to everyone's taste. A stranger, Simeon, comes to stay in a nameless mountain village where the loutish peasants lead a nightmarish ritual existence of bestiality and grotesque perversion. Unaccountably deciding to stay on into the terrible winter, Simeon, an aspiring writer who hopes to turn the whole bizarre experience into a book, loses various organs and eventually his life when he attempts to lead the villagers to a better life on the other side of the mountain.

PRATT, Fletcher

see deCAMP

PRIEST, Christopher

The Perfect Lover:

Scribner's/September/\$7.95

[It is 1985. The Wessex Project, a privately funded scientific experiment, discovers a method of transporting the collective unconscious of some of England's most brilliant minds into an illusory and ideal society. The object: to gather information vital to our survival on Earth. But in the process, power, deception, and love join to jeopardize this philanthropic program. Paul Mason makes Julia Stretton a slave to his love and plots to control the sunny island utopia. David Harkman discovers a yellowing scrap of newspaper that is an historical time-bomb for the imagined world. And Julia, escaping from her ruined life in the real world, thrives in this magical place, which, until the arrival of a disastrous agent, seemed to be her "perfect lover."] Priest is the author of *The Inverted World* and last year's *The Space Machine*, among others.

REYNOLDS, Mack

Space Visitor

Ace/August/\$1.50

Reynolds's latest is an expansion of a novelette that originally appeared in George Zebrowski's 1975 anthology *Tomorrow Today*. [One of the members of an international team of scientists stationed on the moon has found an alien spacecraft—with all its incredible technology and weaponry intact. The discovery shatters the illusion of peace on Earth, as each nation joins the mad scramble to learn the terrible secrets entombed by

101 Basic Computer Games

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What to Do After You Hit Return

Another collection of games and simulations—all in BASIC—including number guessing games, word games, hide-and-seek games, pattern games, board games, business and social science simulations and science fiction games. Large format. 158 pp. \$6.95 [8A]

Fun & Games with the Computer

Ted Sage. "This book is designed as a text for a one-semester course in computer programming using the BASIC language. The programs used as illustrations and exercises are games rather than mathematical algorithms, in order to make the book appealing and accessible to more students. The text is well written, with many excellent sample programs. Highly recommended." —*The Mathematics Teacher* 351 pp. \$5.95 [8B]

Game Playing With the Computer, 2nd Ed.

Donald Spencer. Over 70 games, puzzles, and mathematical recreations for the computer. Over 25 games in BASIC and FORTRAN are included complete with descriptions, flowcharts, and output. Also includes a fascinating account of the history of game-playing machines, right up to today's computer war games. Lots of "how-to" information for applying mathematical concepts to writing your own games. 320 pp. 1976 \$14.95 [8S]

BYTE Magazine

If you are considering a personal computing system now or later, BYTE provides a wealth of information on how to get started at an affordable price. Covers theory of computers, practical applications, and of course, lots of how-to build it. Monthly. 1-Year sub'n \$12.00 [2A]. 3-Years \$30.00 [2B]

Games & Puzzles Magazine

The only magazine in the world devoted to games and puzzles of every kind — mathematical, problematical, crosswords, chess, gomoko, checkers, backgammon, wargames, card games, board games, reviews, competitions, and more. Monthly. 1-Year sub'n \$12.00 [3A]

Games With The Pocket Calculator

Sivasailam Thiagarajan and Harold Stolovitch. A big step beyond tricks and puzzles with the hand calculator, the two dozen games of chance and strategy in this clever new book involve two or more players in conflict and competition. A single inexpensive four-banger is all you need to play. Large format. 50 pp. \$2.00 [8H]

Games, Tricks and Puzzles For A Hand Calculator

Wally Judd. This book is a necessity for anyone who owns or intends to buy a hand calculator, from the most sophisticated (the HP65, for example) to the basic "four banger." 110 pp. \$2.95 [8D]

So you've got a personal computer. Now what?

Creative Computing Magazine

So you've got your own computer. Now what? *Creative Computing* is chock full of answers — new computer games with complete listings every issue, TV color graphics, simulations, educational programs, how to catalog your LPs on computer, etc. Also computer stories by Asimov, Pohl, and others; loads of challenging problems and puzzles; in-depth equipment reports on kits, terminals and calculators; reviews of programming and hobbyist books; outrageous cartoons and much more. *Creative Computing* is the software and applications magazine of personal and educational computing. Bi-monthly. 1-year sub'n \$8.00 [1A]. 3-years \$21.00 [1B], sample copy \$1.50 [1C]

The Best of Creative Computing — Vol. 1

David Ahl, ed. Staggering diversity of articles and fiction (Isaac Asimov, etc.), computer games (18 new ones with complete listings), vivid graphics, 15 pages of "foolishness," and comprehensive reviews of over 100 books. The book consists of material which originally appeared in the first 6 issues of *Creative Computing* (1975), all of which are now out of print. 324 pp. \$8.95 [6A]

Computer Lib/Dream Machine

Ted Nelson. This book is devoted to the premise that everybody should understand computers. In a blithe manner the author covers interactive systems, terminals, computer languages, data structures, binary patterns, computer architecture, mini-computers, big computers, microprocessors, simulation, military uses of computers, computer companies, and much, much more. Whole earth catalog style and size. A doozy! 127 pp. \$7.00 [8P]

Computer Power and Human Reason

Joseph Weizenbaum. In this major new book, a distinguished computer scientist sounds the warning against the dangerous tendency to view computers and humans as merely two different kinds of "thinking machines." Weizenbaum explains exactly how the computer works and how it is being wrongly substituted for human choices. 300 pp. \$9.95 [8R]

Artist and Computer

Ruth Leavitt, ed. Presents personal statements of 35 internationally-known computer artists coupled with over 160 plates in full color and black & white. Covers video art, optical phenomena, mathematical structures, sculpture, weaving, and more. 132 pp. \$4.95 [6D] Cloth cover \$10.95 [6E]

Computer Science: A First Course (2nd Ed.)

Forsythe, Keenan, Organick, and Siemberg. A new, improved edition of this comprehensive survey of the basic components of computer science. There has been an updating of important areas such as Programming, Structured Programming, Problem Solving, and other Computer Science Concepts. The quantity of exercises and problems has been increased. 876 pp. \$16.95 [7D]

Mr. Spock Poster

Dramatic, large (17" x 23") computer image of Mr. Spock on heavy poster stock. Uses two levels of overprinting. Comes in strong mailing tube. \$1.50 [5B]

Problem Solving With The Computer

Ted Sage. This text is designed to be used in a one-semester course in computer programming. It teaches BASIC in the context of the traditional high school mathematics curriculum. There are 40 carefully graded problems dealing with many of the more familiar topics of algebra and geometry. Probably the most widely adopted computer text. 244 pp. \$5.95 [8J]

A Simplified Guide to Fortran Programming

Daniel McCracken. A thorough first text in Fortran. Covers all basic statements and quickly gets into case studies ranging from simple (printing columns) to challenging (craps games simulation). 278 pp. \$8.75 [7F]

Understanding Solid State Electronics

An excellent tutorial introduction to transistor and diode circuitry. Used at the TI Learning Center, this book was written for the person who needs to understand electronics but can't devote years to the study. 242 pp. \$2.95 [9A]

Microprocessors

A collection of articles from *Electronics* magazine. The book is in three parts: device technology; designing with microprocessors; and applications. 160 pp. 1975 \$13.50 [9J]

Microprocessors: Technology, Architecture and Applications

Daniel R. McGlynn. This introduction to the microprocessor defines and describes the related computer structures and electronic semi-conductor processes. Treats both hardware and software, giving an overview of commercially available microprocessors, and helps the user to determine the best one for him/her. 240 pp. \$12.00 [7C]

Creative Computing Catalogue

Zany 12-page tabloid newspaper/catalog lists books, magazines, art prints, and T-Shirts. A conversation piece even if you don't order anything. Free. [5A]

Problems For Computer Solution

Gruenberger & Jaffray. A collection of 92 problems in engineering, business, social science and mathematics. The problems are presented in depth and cover a wide range of difficulty. Oriented to Fortran but good for any language. A classic. 401 pp. \$8.95 [7A]

A Guided Tour of Computer Programming In Basic

Tom Dwyer and Michael Kaufman. "This is a fine book, mainly for young people, but of value for everyone, full of detail, many examples (including programs for hotel and airline reservations systems, and payroll), with much thought having been given to the use of graphics in teaching. This is the best of the introductory texts on BASIC." —*Creative Computing* Large format. 156 pp. \$4.40 [8L]

BASIC Programming 2nd Ed

Kemenv and Kurtz. "A simple gradual introduction to computer programming and time-sharing systems. The best text on BASIC on almost all counts. Rating: A+" —*Creative Computing*. 150 pp. \$8.50 [7E]

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alien visitors eons before... Only one thing prevents total war. Werner Brecht, the discoverer of the vehicle, is the only one who knows its location... and he has disappeared into thin air]lessness.

RICHMOND, Walt (&) Leigh

The Probability Corner

Ace/September/\$1.50

Title in manuscript: "Interface"

[The human mind... the computer brain—fused together, they could form a super-mind, a potential power that might change the course of history, the face of the Earth itself, and the future of mankind. Someone or something had done just that—and the race was on to find out how it had been done... and exactly what it would mean for the future.] Together, the Richmonds wrote five other novels (*Shockwave*, *The Lost Millennium*, *Challenge the Hellmaker*, etc.) and a collection, all published by Ace. Now Walt is dead at 55, leaving his wife to continue the partnership alone.

ROAMAN, Chet

see SWANN

RUSS, Joanna

We Who Are About To...

Dell/July/\$1.50

The fourth novel by the author of *And Chaos Died* and *The Female Man*, a *Galaxy* serial in early 1976, is a grim study of human disintegration in the wake of a disaster in space. [A multi-dimensional explosion hurled the starship's few passengers across the galaxies and onto an uncharted barren tundra. With no technical skills and scant supplies, the survivors face a bleak end on an alien world.] With no hope of rescue, how long can the will to survive continue? All the five women and three men can do is wait to die... unless of course, there is one among them who does not want to wait...

RUTH, Marianne

Outbreak

Manor/August/\$1.50

SEGRAVES, Kelly L.

Dinosaur Dilemma

Beta Books/June/\$2.95 (paper)

(distributed by Two Continents)

[A geologist goes back in time to study dinosaurs and finds them living along with man, civilization and extraterrestrial beings.] First in a new SF series from an 'inspirational' publisher.

STABLEFORD, Brian M.

The Realms of Tartarus

DAW/July/\$1.95

The longest work to date by the author of the Grainger and Daedalus series is in reality three novels in one, of which the first part, *The Face of Heaven*, was published on its own last year in England (by Orbit/Futura). Many thousands of years before this story begins, life on Earth was transformed when friendly aliens erected a mega-structure that completely covered the surface of the planet, shutting out all light from the sun. A utopian society was established on the mile-high platform, a multi-levelled metropolis, Euechronia. All memory of the polluted world below was forgotten, nay, suppressed, until one, man, Magner, haunted by strange dreams, wrote a supposedly fictional work describing the weird existence of the remnant of humanity left behind. Then one of the dreamer's sons decides to investigate and is not heard from again. His brother, Joth—the man with the metal face, follows and finds himself in a hellish world in which he is ill-equipped to survive. His

adventures among the savage tribes of beasts turned men, nightmare vegetation, and endless varieties of hostile life-forms spawned by accelerated evolution, are only the beginning of the events that will establish a new way of existence for all—above and below (where the stars are electric lights that never fade.)

STRUGATSKY, Arkady & Boris

Prisoners of Power

Translated from the Russian by Helen Jacobson

Introduction by Theodore Sturgeon

Macmillan/August/\$9.95

Four books have now appeared in English by the Brothers Strugatsky. A fifth is to follow in November, when DAW will publish *Monday Begins On Saturday*. The present novel concerns [an Earthling's visit to a distant world that has just survived an atomic holocaust. The all-powerful Creators dominate their subjects with mind control radiation until the Earthling, in an apocalyptic ending, destroys their tyrannical rule.] This is the second in Macmillan's new Best of Soviet SF series (see *Galileo* No. 3). (My informant claims that Andrei Tarkovski, director of *Solaris* is currently filming *Roadside Picnic*.)

SULZBERGER, C.L.

(F)

The Tallest Liar

Crown/September/\$8.95

A modern *Candide*, described as an [eight-foot-six albino, Namibian, Aryan-Nazi, Jew teen-ager,] suffers indignities and progressive disillusionment across the entire surface of the planet in this satirical allegory by the author of the outrageous fantasy *The Tooth Merchant*.

SWANN, Christopher

[&] ROAMAN, Chet

YV 88: An Eco-Fiction of Tomorrow

Sierra Club/September/\$6.95

[Through fictional dramatization and a wealth of visual detail (plans, sketches and diagrams), *YV88* transports us into the not-too-distant future, into a world founded on ideas that direct presently available technology toward the revitalization of an overdeveloped wilderness.] This is a world that might yet come to be, where man and nature are in harmony, but only if enough of us can conceive realistic alternatives to despair.

THOMPSON, Joyce

The Blue Chair

Avon/July/\$1.75

Meanwhile, back in the not-too-distant future, here is another possible world. Science has conquered death. Immortality treatments are available for some, but only to those who have had no more than one child and still are considered to have important contributions to make for the general welfare. Apparently, artists and poets and musicians are not considered eligible. Without melodrama this novel considers the plight of an elderly couple with two children. The husband is a scientist; the wife a poet who has contracted cancer.

TOLKIEN, J.R.R.

(C) (F)

The Silmarillion

Houghton, Mifflin/September/\$10.00

Said J.R.R. Tolkien, "Do not laugh! But once upon a time... I had a mind to make a body of more or less connected legend ranging from the large and cosmogonic to the level of romantic fairy-story. It should possess the tone and quality that I desired, somewhat cool and redolent of our (English) 'air' and (if I could achieve it) the fair, elusive beauty that some call Celtic... yet it should

be 'high'—purged of the gross and fit for the more adult mind of a land long steeped in poetry. I would draw some of the great tales in fullness, and leave many only placed in the scheme, and sketched. The cycles should be linked to a mystic whole and yet leave scope for other minds and hands, wielding paint and music and drama. Absurd." At first he called it "The Book of Lost Tales" and then it became known as *The Silmarillion*. This "matter of Middle-Earth" has long in itself been legendary and a subject of endless speculation. Were we ever to see it in print? When Tolkien died in 1973, with the manuscript still unfinished, some abandoned all hope. When it was announced that it was to be edited by his son Christopher, this, too was a cause for concern. Well, here it is at last, neither so vast as some would have had it, nor so incoherent. Christopher Tolkien has arranged the material to present a single text, with an internally self-consistent narrative. The book begins with "The Ainulindale Valaquenta," a myth of the Creation and the dawn of the First Age. The title portion, longest of the four segments, recounts [the birth of by Morgoth; the rebellion of the Elves against the dwell with them in their paradise of Valinor in the far West, beyond the sea. There follows the making of the Silmarils, the jewels of light, greatest of all the achievements of the Elves and the theft of them by Morgoth; the rebellion of the elves against the Gods; and their exodus from Valinor and return to Middle-Earth to wage war against the Dark Lord.] Two short separate works complete the book. The Akallabeth or Downfall of Numenor is an 'Atlantis' legend, in which Sauron first appears, the agent for the destruction of that proud island kingdom and the departure of the Gods into "the realm of hidden things." Of the Rings of Power tells of the last events of the later Ages, placing in context the events of the War of the Rings. Tolkien did not regard himself as the inventor of this mythology but the "recorder" of an underlying reality whose truth was a "given thing." He labored over a lifetime to bring into order the glimpses of this reality. The meaning that his work has had for others is both his memorial and the measure of his success.

VanLUSTBADER, Eric

The Sunset Warrior

Doubleday/July/\$6.95

This is another one of those future societies driven underground by a conflict that has rendered the world above uninhabitable. Society has become as stratified as the many levels of the Freehold. [Ronin, a young rebel whose destiny lies before him, has been secretly trained in the martial arts and fencing by an elusive warlord, the Salamander. The military caste structure is all he knows. But one day Ronin learns that there is an alternative to the stagnant culture below, and in so doing, incurs the enmity of the warlords, who will do anything to preserve their power.] A sequel will follow in the spring of 1978.

VARDEMAN, Robert E.

The Sandcats of Rhy!

Major/August/\$1.50

The first novel by a well-known Albuquerque fan (publisher of the Hugo-nominated fanzine *Sandworm*) and a former Atomic Energy Commission scientist with a Master's degree in nuclear engineering tells of [a scientist and a cyborg who go hunting for a lost civilization on a distant planet and discover—or are discovered by—the dangerous new animals called "sandcats."]

WATSON, Ian

The Martian Inca

Scribner's/September/\$7.95

Published in UK by Gollancz in January, 1977

The Embedding and *The Jonah Kit* established Ian Watson as a writer to watch, with a penchant for counterpointing widely disparate intellectual themes. In this third novel [an unmanned Russian spacecraft, containing soil samples gathered from the surface of Mars, crashes near a remote Bolivian village. The Indians who salvage the remains fall into a mysterious comatose condition. Only two recover: Julio, young, proud, ambitious, and Angelina, his beloved. Reawakening, they are conscious of a strange new awareness of themselves and of the world outside. Julio believes himself to be "The Inca"—the divine imperial ruler—reborn, with the duty of restoring the Indians to their former dignity and glory. At the same time, a manned American spaceship is on its way to Mars to deploy a device which will render the planet suitable for human habitation. It is essential that the three-man crew be warned of the danger represented by the planet's soil, further complicating an already tense situation. What causes its uncanny effects? The answer may provide a clue to a vital discovery about human evolutionary potential.]

WHITE, T.H. (F)

The Book of Merlyn:

The Unpublished Conclusion To The Once and Future King

University of Texas Press/September/\$9.95

Illustrations by Trevor Stubley

Prologue by Sylvia Townsend Warner

In a year already remarkable for the posthumous appearance of previously unseen works by Lewis Carroll, C.S. Lewis, and J.R.R. Tolkien, it is perhaps not too surprising to learn that we had not read the last word by yet another celebrated fantasist. The present item was an unexpected find in a group of White's papers contributed after his death in 1964 to the Humanities Research Center of the University of Texas (thus accounting for an otherwise unlikely source). World War II seems both to have inspired the writing of this final chapter and to have prevented its publication (ostensibly due to a wartime paper shortage, but perhaps because the author was too didactic or self-revealing).

On his last night on Earth, Arthur is once more taken in hand by his erstwhile mentor (he of the great simultaneous presence and absence of mind). Merlyn has a final lesson to impart. As it was when Arthur was the Wart, it is the animals who perform the instruction, simply by being what they are (and he among them). Briefly, the king is badger, ant and goose, wiser and then...no more. A timeless message, out of its time: What more could one expect from an anachronistic enchanter?

WILDER, Cherry (J)

The Luck of Brin's Five

Atheneum/September/\$7.95

Cherry Wilder is from New Zealand, lives in Germany and has seen several books of hers published in Australia, several stories in England and, up to now, only two in the United States. [Torin, world and continent, is a pleasant place, even if only because the rulers suppress progress. Nonetheless, to such an intruder as Scott Gale, part of a bio-survey team from Earth who crash-lands his space-air vehicle, it is a strange, exotic planet, with a curious social structure. Scott is found by Dorn, eldest child of the family group known as Brin's Five, to whom he becomes "Diver." Because of Diver, the family is led to fortune, adventure and grave danger in a time of tension and shifting values for all Torin. (for ages 12 and older).]

Drew Whyte

WILLIAMS, Gordon

The Micronauts

[Film tie-in]

Bantam/August/\$1.95

Does the man who understood *The Man Who Understood Women* understand insects? [Earth's resources were exhausted. Civilization had collapsed. Food was a luxury in a world poisoned by chemical wastes and doomed by uncontrollable violence. Man's last hope was Project Arcadia, the bizarre experiment submitted to by a group of dedicated scientists. They were the new pioneers...] Is this a fantastic voyage or a *reductio ad absurdum*? At any rate, a film of the same title is soon to appear at a theater near you (probably just about the same time as the long delayed *Cold War In A Country Garden*) *Attaboy!* This may just be a straw dog in the wind, but I like giant ants! Damn the square-cube law! Full speed into the microcosm!

ZEBROWSKI, George

War Stars

[Omega Point—Trilogy: Volume 1]

Ace/September/\$1.50

Zebrowski's first novel, *The Omega Point*, published in 1972, was the mid-section of a trilogy, of which *War Stars* is the opening volume. [The terrible war between the Earth Federation and the Herculean Empire has been over for three centuries. The Herculeans had been defeated, their planet reduced to a burnt-out cinder, the last few surviving remnants of their people living in a religious commune on Myraa's World, half a galaxy away. But on an unnamed planet, hidden deep within the Hercules Globular Cluster...] A reissue of the earlier sequel and the concluding volume,

Mirror of Minds, will follow shortly. (Incidentally, probably no one will believe it, but Zebrowski had his title picked out, long before the book and movie of nearly the same name. People are so cynical!)

ANTHOLOGIES

ASHLEY, Michael [editor]

The History of the Science Fiction

Magazine: Volume III (1946-1955)

Contemporary Books*/September/\$9.95 (hard)

*formerly Regnery

\$4.95 (paper)

ASIMOV, Isaac [editor]

The Hugo Winners: Volume III (1971-75)

Doubleday/August/\$12.50

CARR, Terry [editor]

The Best Science Fiction of the Year #6

Holt, Rinehart & Winston/July/\$9.95

Ballantine-delRey/July/\$1.95

DOZOIS, Gardner R. [editor]

Best Science Fiction Stories of the Year:

Sixth Annual Collection

Dutton/July/\$8.95

DURWOOD, Thomas [editor]

Ariel: The Book of Fantasy

Ballantine/September/\$6.95

Contents same as Volume Two published earlier in 1977 by the Morning Star Press of Kansas City.

GREENE, Ellen [editor]

(F)

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Morrow/September/\$6.95
For ages 8-12.

GUNN, James [editor]

**The Road to Science Fiction: From
Gilgamesh to Wells**
NAL Mentor/September/\$2.25

HOKE, Helen [editor] (F)

Creepies, Creepies, Creepies
Franklin Watts/September/\$5.90

HOSKINS, Robert [editor]

The Future Now: Saving Tomorrow
Fawcett Crest/July/\$1.75

MOBLEY, Jane [editor] (F)

**Phantasmagoria: Tales of Fantasy and
the Supernatural**
Doubleday Anchor/September/\$3.40 (paper)

MONTELEONE, Thomas F. [editor]

**The Arts and Beyond: Visions of Man's
Esthetic Future**
Doubleday/September/\$7.95
Specially illustrated by divers hands.

PAGE, Gerald W. [editor] (F)

The Year's Best Horror Stories: Series V
DAW/July/\$1.50

PARRY, Michel [editor] (F)

Great Black Magic Stories
Taplinger/August/\$8.95

SCHIFF, Stuart David [editor] (F)

Whispers
Doubleday/August/\$7.95
Illustrated.

SILVERBERG, Robert [editor]

**The Infinite Web: Eight Stories of
Science Fiction**
Dial/July/\$7.95
Postponed from March.

Alpha 7

Berkley/July/\$1.50

**Galactic Dreamers: Science Fiction As
Visionary Literature**
Random House/August/\$8.95

TORGESON, Roy [editor]

Chrysalis
Zebra/July/\$1.50

UNDERWOOD, Peter [editor] (F)

Thirteen Famous Ghost Stories
Dutton Everyman/September/\$2.25 (paper)
First published (June 1977) in England by Dent as
Everyman's Book of Classic Ghost Stories.

Reference explanation for ALEPH:

The following reference codes have been added for convenience and are noted on the same line as the author's name: (C) Collection, (F) Fantasy, (J) Juvenile. Since SF novels make up the majority of books listed, none of these are specified as such. Material from sources other than the compiler is given [in brackets].

—G—

Wernher von Braun 1912-1977

**Anything one man can imagine, other
men can make real.** —Jules Verne

Some men like to repeat intriguing quotes, while others live what they say. Wernher von Braun, who died on Thursday, June 16, 1977 was one of the latter, a man who made other men's dreams come true.

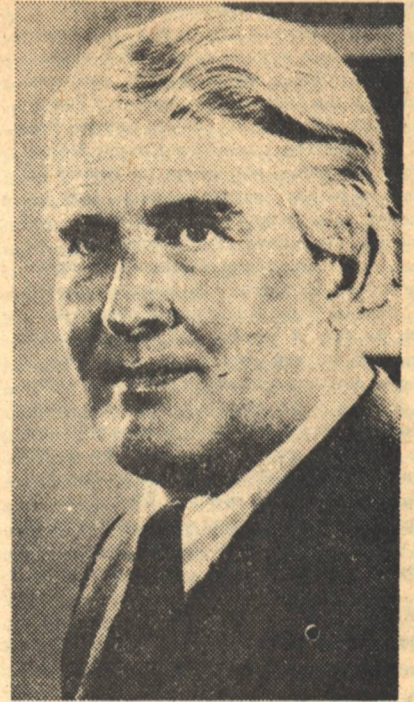
Best known for his work on the Saturn-V which boosted 9 crews of American Astronauts to the Moon, von Braun was one of the major creative forces behind this nation's space program. "A man of bold vision," according to President Carter.

Born in Wirsitz, East Prussia on March 23, 1912, he was conducting rocket experiments by the time he was 18, using a municipal dump on the outskirts of Berlin as his firing range.

In 1932, von Braun, then 20, was interrupted in his rocketry experiments at the dump by three German Army men who pulled up on a black sedan. It marked von Braun's entry into what was to become the V-2 program, though the scientist looked on it as an opportunity to explore space. Over 30 years later, his work on those missiles used to terrorize London in the waning days of World War II still caused hecklers to haunt his subsequent triumphs.

At the end of the war in early 1945, von Braun and 118 of his Peenemunde engineers fled south searching for the American vanguard to surrender. Later, in 1947, he was allowed to return to Germany to marry his 18-year-old second cousin, Maria Louise von Quistrop.

In America, von Braun continued with the work which was interrupted that day at the dump outside of Berlin and twisted by the war. His efforts resulted in the Redstone missile and then the Jupiter-C, a four-stage rocket



NASA/Associated Press

which ironically could have placed an American satellite into orbit a full year ahead of the Russian Sputnik, was launched in 1957.

When von Braun was finally permitted to follow through on his work, Explorer 1 discovered the Van Allen radiation belts which encircle the earth. It marked the first time a satellite revealed a major scientific discovery.

Joining NASA when the agency was formed in 1958, he eventually became responsible for the construction of the Saturn-V. Four times more powerful than any rocket ever built, it fulfilled mankind's centuries-old dream of reaching the moon.

Even though the rocket expert left NASA in 1972 when financial support for the space agency declined in Congress, von Braun never lost sight of his goal and in 1975 founded the National Space Institute, a private organization dedicated to increasing public awareness and support for space exploration.

While building the dreams of his predecessors, von Braun also created a few dreams of his own. He authored books which predict orbiting space stations, and massive flights to Mars.

Throughout his life, though others often misused the products of his mind, von Braun always dedicated himself to making real what other men imagined. He left enough dreams for all of us.

—G—

Advertising in Galileo magazine

Published quarterly: January, April, July, and October. Projected bi-monthly.

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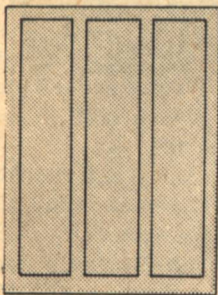
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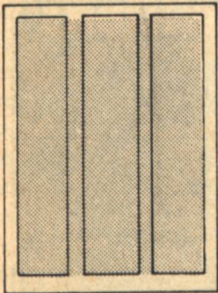
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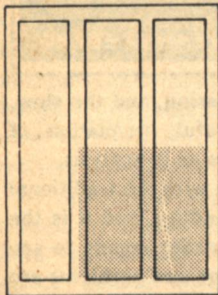
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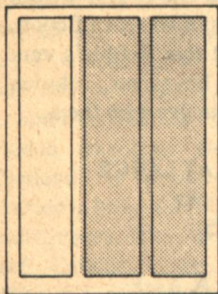
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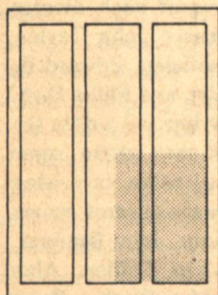
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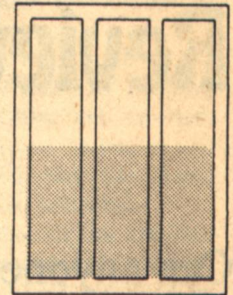
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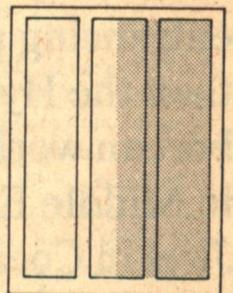
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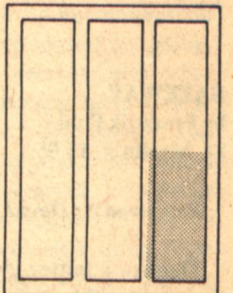
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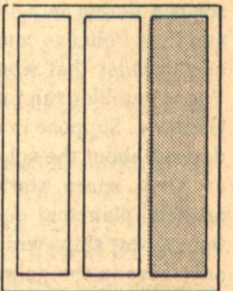
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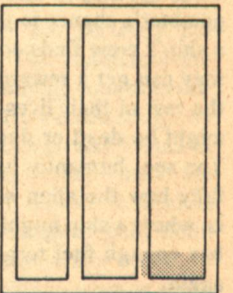
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Reviews

Can anyone picture Conan in a more entrancing place than the Hyperborean world, Frodo in Middle Earth, or Jirel in Cogaingne?



GATEWAY
by Frederik Pohl
St. Martin's, \$8.95

Reviewed by David Johns

Think of a better idea for a story and the world will beam a path (if paths can be beamed) to your door. It's often said science fiction is a literature of ideas, and Fred Pohl has come up with a super one, a twist that would make any Las Vegas gambler run for a ticket booth to Gateway. Suppose in humanity's meanderings about the solar system, we find an alien space station—Gateway—an artificial planetoid equipped with functioning star ships which crews can fly to anywhere in the galaxy, even out of it. It's a daydreamer's supreme fantasy and any desperate, don't-give-a-damn gambler's chance to get the good life. If a ship's crew finds something of value, they can get a reward and royalties for the rest of their lives. If they fail, they might be dead or damned for eternity. You see, humanity has not figured out fully how the alien ships operate; that is, where a ship might go and whether it has enough fuel to get there and back again.

To become a crewman on these ships
80 GALILEO

takes nerves of steel, and being mere human beings, the crewmen and characters of Pohl's novel are subject to a good many personal and psychological hardships within themselves and in their dealings with each other. They are crippled in one way or another, and this really isn't a surprise in a Pohl story. He's long been a writer who emphasized his characters' hangups and how their dealings with each other are affected by those problems. Sometimes this preoccupation has seriously hurt Pohl's work, but in *Gateway* it is enormously successful.

The central character is Robinette ("Bob, Rob, Robbie") Broadhead, who tells of his climb from the shale mines of Wyoming to the penthouses of New York. It was a journey full of danger, fear, pain, the deaths of people he knew and loved, and guilt over his survival. Now Robbie, a middle-aged man with ulcers and crying spasms, recounts the story of his life to the reader and to his analyst, Sigfrid, a computer. While the idea of *Gateway* is enthralling, even more fascinating are the scenes between Robbie and Sigfrid. Without any of the dullness that psychological plots can have, Pohl shows the reader all the struggles for power, the devious games

of deception and evasion, and the slow, not always successful, revelation of personality that goes on in analysis.

This is not a book with the traditional pot-of-gold happy ending, and it is the better for it. The reader comes to see that Robbie's feelings and problems are exceedingly human ones of pain, guilt, frustration, love, and others that are not the cardboard labels of so much fiction, and it's the sad fact that Robbie's very human problems have no solution except to learn how to live with them.

SCIENCE FICTION AT LARGE

Edited by Peter Nicholls

Harper & Row, \$8.95

Reviewed by Curt P. Beck

To find the essays of such diverse authorities as Professor John Taylor, the English mathematician, Edward de Bono, the psychologist, and Philip Dick, the science fiction writer, all within the covers of one book may strike some people as surprising. More surprising yet is that they share those same covers with Ursula K. LeGuin, John Brunner, Harry Harrison, Alvin Toffler, Alan Garner, Thomas M. Disch, Peter Nicholls, and Robert Sheckley. But so it

Reviews

is. The book is a compilation of the lectures presented for the 1975 science fiction convention at the Institute of Contemporary Arts in London.

The explanation for the seeming disparity of speakers is that the lectures were planned to be not about science fiction *per se*, but rather, about the interface between science fiction and reality; they were to be about science fiction *and*. Ursula LeGuin linked science fiction and character, Edward de Bono, science fiction and thinking. Harry Harrison spoke of science fiction and history, Alvin Toffler of science fiction and change.

Peter Nicholls, in organizing the lecture series and in editing the subsequent book, hoped not to preach to the already converted, but rather "to reach the silent majority, the general science fiction readership, who, rightly or wrongly, would rather die than attend a science fiction convention." Consequently, *Science Fiction At Large* is not the published eulogies of SF votaries. In general most speakers spent considerable time and energy in saying what was wrong with the genre. As Nicholls points out in his introduction, "this book constitutes an indictment of the genre more sweeping, though by no means total, than any other that has ever appeared before, and very much better informed."

As one might expect from eleven lectures by eleven different speakers, there appreciable discrepancies in quality among them. Philip Dick's dabbling with hallucinogens might be no detriment to his fiction, but to his critical and analytical thinking it has done obvious harm. His essay (which was not, incidentally, presented at the London convention: Dick's health precluded travelling from California to England) is reminiscent of Aldous Huxley's later ramblings after similar indulgences. Dick, drawing from Sufist and Cabalist texts, Charles Tart's *Altered States of Consciousness*, and the writings of Teilhard de Chardin, to mention but a few of his diverse sources, concocts a fantastic theory of the universe and of time, which he presents factually and which he apparently would have the reader take seriously. There are few things more trying than a mystic attempting to be scientific, or more absurd.

John Brunner and Ursula LeGuin, on the other hand, both presented first-rate lectures, each well worth the price of the book. Brunner speaks of science

fiction and the "larger lunacy" in a lecture which deplors the falsehoods propagated by such science-fringe writers as von Daniken, Pauwels, Bergier, Velikovskiy, etc. Perhaps Brunner spends overly long in debunking those writers (one expects most educated people to have done so for themselves) but his point, the responsibility of the science fiction writer, is well presented.

Ursula LeGuin, in an essay evoking Virginia Woolf's unforgettable Mrs. Brown, makes the plea for character in science fiction. Her tone is critical, but always constructively so, and one can't think of a writer in any genre who mightn't benefit from it.

Despite the diversity of opinions held by the various speakers, a consensus emerges from *Science Fiction At Large* as to what science fiction is and what some of its functions are. The substance of this consensus cannot be fairly related here. But more telling than this unity, is the critical examination of the genre itself. Heretofore, science fiction writers have been, for the most part, defensive of their genre—understandably so, in light of the hostility encountered from "serious literature" circles. It is this critical spirit, this willingness to examine SF not in some dim other-world light, but in the light of our reality, that marks *Science Fiction At Large* as a primogeniture of sorts, and a worthy addition to anyone's bookshelf.

THE SIGN OF THE MOONBOW

by Andrew J. Offutt
Zebra, \$1.50

Reviewed by David Johns

"A cadaverously thin man stood close against the ship's mast, his back to it. His robe flapped in the breeze that drove the one-sailed craft across the sea that lapped south and east of Britain. Night-dark was that robe; tall was its wearer. He was bound in place, though not with ropes. Cords could not hold such a one able to assume slithering forms other than his own. Nor could he be prisoned with leather, or with chains of iron or steel."

Robert E. Howard created a colorful and lusty crew of adventurers like Conan, Bran Mak Morn, Cormac Mac Art, Jull, and others who have been revived with varying degrees of success. Some of the revivals are just bad; some not bad but lacking the fires that

embued the originals; some have been well written but stretched beyond the limits of their models in ways that distressed lovers of Howard's work; and some, thank Crom, have been as much fun, as rousing and action-filled as Howard's own stories.

In the novels of Cormac Mac Art, *Sword of the Gael* and *The Undying Wizard*, Andrew Offutt did excellent work. Now in *Moonbow* he begins and ends just as well but has some disappointing sections in between.

The problem is that for the first half of the book, Cormac and his friends spend time on an island inhabited by the peace-loving, peaceful living ancestors of leprechauns. Peace is all very well, but Cormac is not the character for it, and the reader suffers through much boring inactivity during this interlude. Enough so that he might, unfortunately, leave before things get good.

If he doesn't he will be rewarded in the book's second half, but in the meantime he can think about two mistakes Offutt may have made. Cormac, it happens, is looking for a way to kill the archwizard of evil, Thulsa Doom. Quests are quite normal in fantasy. Heroes have looked for grails, rings, abducted princesses, and other tokens of power. Looking for a way to kill your greatest foe is also normal, and usually after hearing about the hero's search, the black-hearted antagonist sends all manner of troubles the hero's way. However, as one might guess from the opening paragraph above, Cormac doesn't do it quite that way. No, he lugs along a captive Thulsa Doom on the search for Thulsa' doom, and this is so far-fetched that readers may simply not swallow it. Fortunately, in the second half of the book Thulsa is whisked off stage.

Offutt's second possible mistake (and future books will certainly be interesting in this regard) is that by Thulsa's efforts, Cormac and friends are transported to a parallel world, similar to but slightly different from the one they were in before. Now parallel worlds are very attractive, but they are certainly not needed in fantasy. The characters are already in strange enough and interesting enough places. How could things be improved? Can anyone picture Conan in a more entrancing place than the Hyperborean world, Frodo in Middle Earth, or Jirel in Cogaighe? They don't need parallel worlds for major action.

Despite these cavilings there is much in *Moonbow* for the fans of swords and

sorcery to savor. Offutt can be as good as Howard in colorful, detailed descriptions of setting and action. For example, the first paragraph of *Moonbow* is as enthralling as the oft quoted opening of *Conan the Conqueror*:

"The long tapers flickered, sending black shadows wavering along the walls, and the velvet tapestries rippled. Yet there was no wind in the chamber. Four men stood about the ebony table on which lay the green sarcophagus that gleamed like carved jade. In the upraised right hand of each man, a curious black candle burned with a weird greenish light. Outside was night and a lost wind moaning among the black trees."

When Cormac descends into a subterranean kingdom beneath Ireland, he enters a world of royal intrigue, and desperate combat that will satisfy the most action-thirsty reader, and it all climaxes in a slashing battle of broadswords and wizardry that will have readers too dizzy to count the bodies as "the center of the temple of the goddess became a sea, a writhing storm-swept sea, of shining mail and blood."

A WREATH OF STARS

by Bob Shaw

Doubleday, \$5.95

Reviewed by Floyd Kemske

"Harold Harper spoke in a dreamy voice, occasionally lapsing into Swahili..."

This line in *A Wreath of Stars* is followed by a full page of conversation in which not one word of Swahili occurs. The incongruity is unsettling, even to the reader who has "willingly suspended disbelief." This is not to say *A Wreath of Stars* is completely spoiled by one small problem, but the same lack of care which permitted the "lapsing" conversation is probably responsible for the book's failure to fulfill the potential of its plot situation.

In 1993, astronomers discover a body on a virtual collision course with the earth. Thornton's Planet is visible, however, only with the aid of Amplites—newly developed lenses which enable people to see in the dark. It becomes apparent that Thornton's Planet is made of anti-neutrino matter anyway and so would cause no damage in the collision. But once the wanderer has passed by, funny-looking blue people begin appearing to miners (and ultimately to everybody else) wearing

Amplite lenses. The perturbation of the new-collision has distorted the orbit of a whole anti-neutrino world which exists in another dimension...and is located within the earth. Moving out of its earth-coincident orbit, the anti-neutrino world appears to be emerging from the surface of our own planet.

Dealing with this physical prodigy are a group of characters from this dimension (appropriate, perhaps, to their one-dimensional nature). These are an observatory director with an academically shady past who is the first to appreciate the nature of events, a tough but attractive lady journalist who is quick to appreciate the observatory director, and a misfit pilot and adventurer named Gilbert Snook who greatly appreciates the lady journalist. Brought together by circumstance to attempt communication with the beings from the planet inside, these people find themselves to be the small but tenacious group of 'believers' known so well to science fiction fans. The love triangle, the labor problems at the African mines where the action takes place, the local political situation, and the personal problems of Gil Snook make the earth compare rather badly with Avernus—the name chosen for the anti-neutrino world. Avernus is a sort of wooden place full of philosophers and scientists who accept the universe and nature's tragedies with stoic equanimity. Thank goodness their primary method of communication is telepathic and Gilbert Snook is a natural telepath himself, thus facilitating communication with the earth.

The scientific background for *A Wreath of Stars* is consistent and believable and the unusual plot situation maintains reader interest almost by itself. The off-the-rack characters, however, and occasional stylistic lapses will keep this novel from being a major event in science fiction.

UNIVERSE 7

Edited by Terry Carr

Doubleday, \$5.95

NEW DIMENSIONS 7

Edited by Robert Silverberg

Harper & Row, \$8.95

NEBULA AWARD STORIES 11

Edited by Ursula K. LeGuin

Harper & Row, \$8.95

Reviewed by Floyd Kemske

Short story anthologies are the cash crop of science fiction publishing and sometimes it seems like the industry is unduly weighted in that direction. How many collections of *The Year's Best Science Fiction* can the reading public support? There must be dozens of them, which is all the more upsetting when you stop to think that few of them are read by the fans, who have already read the year's best science fiction before it is ever collected. The truth is, anthologies are being read a lot by 'outsiders' and these dozens—no, hundreds—of collections become our primary form of communication with mainstream readers. So it behooves us to try to monitor the things. We have three here which rank a cut above your garden-variety *Year's Best Science Fiction* and can serve as excellent ambassadors for our industry as well as good reading for fans.

Universe 7, for example, comprises all new stories. It strives to present the unconventional, not to say wierd, and will remind readers that the genre can be marvelously inventive. The highlights include "Probability Storm" by Julian Reid, a remarkable narrative conducted by a disincorporate individual who has only the most tenuous control over where and even what he is. The action takes place in Rafferty's Tavern, a bar located at a statistical pole ("there are statistical fields as well as magnetic ones, and they too have poles...") which makes it a place of shifting realities not to mention a hangout for other-dimensional gremlins. In "People Reviews," Robert Chilson has written not so much a short story as a review essay dealing with half a dozen life-recordings, examples of an art form in which people use a device to record their inner lives for public consumption. "Brain Fever Season" by R.A. Lafferty demonstrates the most palpable originality. What else can you say about a story that begins with a scientist—who employs an australopithecine lab assistant—attempting to solve the mystery of a sudden increase in the national sales of *A Grammar of the Tibetan Language* in adult bookstores? It doesn't rank among the great grammars, he says, even for Tibetan. "The Ninth Symphony of Ludwig van Beethoven and Other Lost Songs" is Carter Scholz's foray into time travel, involving the habitation of the minds of the past by scholars of the future and their merciless exploitation of their own ancestors. There are also unusual

Reviews

stories by Brian Aldiss, Fritz Leiber, and Gene Wolfe, helping to demonstrate that even the establishment can take a turn at something unorthodox. In addition, however, there is a basic unity in the unique taste of Terry Carr which makes the book an entity as much as a collection.

The current volume of *New Dimensions* is number seven. It is a well-respected series, owing much to editor Robert Silverberg's lifelong commitment to exposing new talent. Gordon Eklund's story, "The Retro Man," is about a ruthless business tycoon who suffers poetic revenge at the hands of a group of peaceable aliens who subject him to time-reversal. He thus lives through his misspent life several times and as he goes through it backwards he is powerless to change anything because in every case he has already done the damage. "The Almost Empty Rooms" by John Shirley is practically guaranteed to make you question your sanity. The narrator believes that events are conscious organisms, invisible to us people who make them up as mere functioning cells. He attempts to influence the actions of these event-animals by confusing them and in the process forces the reader to question his own notion of reality. Steven Utley and Howard Waldorp, in "Black as the Pit, From Pole to Pole," have taken several items from nineteenth century science fiction (Frankenstein's monster, the world-inside-the-earth idea) and combined them with the modern elements of interior monologue and greater scientific plausibility to produce what Silverberg calls "a goofy masterpiece." No one has ever shown such feeling for the Frankenstein monster. If your taste runs to fairy tales, you might be taken with "The Princess in the Tower 250,000 Miles High" by Fritz Leiber, which is about a bridge from the earth to the moon and a man who crosses it with his daughter. On second thought, if you like fairy tales you might not have the proper appreciation for the despair involved, not to mention the incest. There are also stories by Barry Malzberg (which might be enough in itself to make *New Dimensions 7* a collector's item), Felix Gotschalk, and Gregory Benford, as well as a translation of a French science fiction story by Henry-Luc Planchat. Every item in *New Dimensions 7* is worth reading, especially if your taste runs to the strange.

Even the most casual readers are now aware of science fiction's awards and

Reviews

use them as screening devices to prejudge quality of books and stories. Thus there are economic as well as other reasons for *Nebula Award Stories II*. There are four categories of winners in the Nebula competition and editor Ursula K. LeGuin's collection includes nine items. It is a neat trick which she accomplishes by throwing in two non-fiction articles and three other stories which she particularly likes.

"Catch That Zeppelin!" by Fritz Leiber won the award for short story last year and deservedly so. It is an alternate time-stream story of a world which had no world war and has developed an extensive network of air commerce using zeppelins. And for a few harrowing moments, the narrator walks into our time stream. In the novel category, Joe Haldeman took home a Nebula for *The Forever War* and it is represented here by "End Game," an excerpt of the novel which was originally published in 1974. It centers on a centuries-spanning war between humans and Taurans, both of whom discover time travel and play hide and seek across space and history, appearing to confront each other with weapons which are by turns incredibly advanced or hopelessly obsolete. The narrator, in addition to his duties as a unit commander, is faced with the task of trying to find his girl who was assigned to a different unit and different time.

"Home is the Hangman" by Roger Zelazny won best novella and, since I see it was recently reprinted in a collection of related stories under the title *My Name is Legion* (Ballantine), this makes three places you can read it. It probably merits three publications, though. Another of Zelazny's detective stories about the operative who managed to avoid being catalogued in the great computerization and uses the resultant anonymity to earn a living doing things only a nonexistent person can do, it is a suspense story including several murders and a robot which acquires sentience. Tom Reamy took his award for novelette with "San Diego Lightfoot Sue," one of those items which people will forever acknowledge as brilliant but probably dispute its claim to status as science fiction. Lacking any gimmick, a future setting, or scientific background, it is a rather simple love story. John Lee Peacock arrives in San Diego from Kansas in apparent response to a spell thrown by an aging female artist who has taken up witchcraft. The charm of this story is in

its characters: the believable innocence of the boy from Kansas, the good-hearted homosexuals he encounters, and the Faustian artist who loves him.

Editor LeGuin's choice for filler—"Child of All Ages" by P.J. Plauger, "Shatterday" by Harlan Ellison, and "Time Deer" by Craig Strete—are the kind of sophisticated and classy fiction you would expect a major writer to like. The child of all ages is a schoolgirl with the secret of eternal youth who is forced to move from family to family in order to prevent suspicion over her failure to grow (I know it sounds familiar, but believe me there is a twist in the character of the child). Shatterday is the day Peter Novins telephones his apartment and is answered by Peter Novins. The two Novinses then wage war, knowing only one of them can survive and the logistics ("First the bank, to clean out the checking account") are fascinating. The time deer provides a focus for the time-distortion faced by an ancient American Indian who cannot prevent his institutionalization by his son and daughter-in-law.

It takes a writer of LeGuin's stature to obtain original essays from noted science fiction critics and then to force the publisher to allow them in a collection of stories. Peter Nicholls's "1975: The Year in Science Fiction" presents a lot of evidence that the "science fiction empire" is in a state of collapse. Not to worry, however, because the essay also explains how this collapse is a good thing. In "Potential and Actuality in Science Fiction," Vonda N. McIntyre takes the industry to task for complicity in its own trivialization, but she does offer instruction for dealing with it and points out that the trend is in a different direction already.

The concept of the short story anthology has a lot of potential for abuse by publishers and after seeing *Sports Stories in Science Fiction* on the shelves this year, I began to wonder if I might not eventually be asked to review *The Arthur C. Clarke Stories Beginning With "The"* or *Love Themes in Science Fiction*. The reading public is fortunate to have editors such as Carr, Silverberg, and LeGuin who try to make sure we get new and significant material for our money.

—G—

2020...

Even 2001, while it dazzled the eyes, left the brain feeling like a car motor that went 50,000 miles without an oil change.



STAR WARS

by George Lucas

Reviewed by Floyd Kemske

Stupendous! Colossal! Fantastic! . . . calm down, calm down. You're writing a film review, not an eyewitness account of the Second Coming. Okay? Okay. Let's try it again. . .

This movie deserves the trillion dollars it will undoubtedly gross because—even if it is only space opera—it is the apotheosis of space opera. It is a story of high adventure with a well-constructed plot (the fortuitous hyperspace gizmos and coincidental encounters are actually pretty rare), a timeless theme of political struggle, and special effects which inspire ovations. Sure, the characters are stereotypes. You have met them in the Saturday matinees of your childhood. Watching the film may remind you of the ancient Flash Gordon series with Buster Crabbe, although these computer-enhanced, multi-dimensional special effects are millennia beyond Flash Gordon's marionette spaceship with sparklers in the tail. Sure, there is a somewhat less-than-credible happy ending. But there is

suspense that can make you jump around in your seat, comedy that causes you to laugh out loud, and scenes of combat that raise your pulse significantly.

Star Wars pits Luke Skywalker, a teenage hero who looks like Lassie's owner, against Lord Darth Vader, an archvillain who looks like Robbie the Robot (and sounds like James Earl Jones). There is more than that, however: the bad guys have not only captured the beautiful princess, but they've constructed a planet-size fortress and are plotting to subdue the Universe. The hero is aided in his struggle by a pair of incorrigible robots (incorrectly described, I thought, as androids), a freelance space pilot who is a sort of athletic Eddie Haskell, an alien Wookiee with the countenance of Elsa the lion and the stature of a Watusi warrior, and Alec Guinness. The story is classic. A recipe would read: first evade the bad guys who have taken over nearly everything, then steal into their very own fortress, escape with the princess against impossible odds and under the most harrowing circumstances, wait for the bad guys to follow, and attack and subdue them. *Star Wars* is without philosophical substance, but

to criticize it on that basis is tantamount to researching the moral content of Disneyland.

The film producers have based their marketing campaign on the slogan "never has so much technology been invested in the cause of good fun" or something of the sort. Nobody can accuse them of false advertising. The technology is overwhelming, the fun continuous. Maybe you can imagine somebody posing with a sword of blue light (like a fluorescent light bulb without glass), but can you imagine him fighting a duel with it? Maybe you can imagine a space ship gliding across a movie screen, but can you imagine one careening across the screen so you see it from every angle and detect real motion? And against a backdrop of stars and planets? Maybe you can imagine a strange-looking alien, but can you imagine a whole barroom full of them, every conceivable shape, configuration, voice tone, skin color, disposition, and visage? When I saw the film, the audience stood up and applauded the credits, interminable though they were. There must be one sour note, however. Why in the midst of the most breathtaking special effects ever devised must we be subject to the roaring, whistling,



or whooshing of rocketships through the near-vacuum of space? This flaw is worthy of the abomination known as *Space:1999*, but certainly has no place in the apotheosis of space opera. I suppose, as we prepare for this new era in science fiction films, that we should admit we can't have everything.

Star Wars is an adventure you won't want to miss. I just hope you don't have to fight me for a seat. I'm going to see it again...and I'm taking along my hyperspace blaster.

Is the review over now? Good. Outstanding! Amazing! Marvelous!

STAR WARS

by George Lucas

Reviewed by David Johns

Do you think that *The Adventures of Robin Hood* with Errol Flynn and Basil Rathbone is one of the most purely enjoyable films ever made, that even such small things as the type of processing for its color contribute to the sheer pleasure you get from it? Then make room in your pantheon for *Star Wars*, the first wholly entertaining science fiction film I have ever seen.

2020...

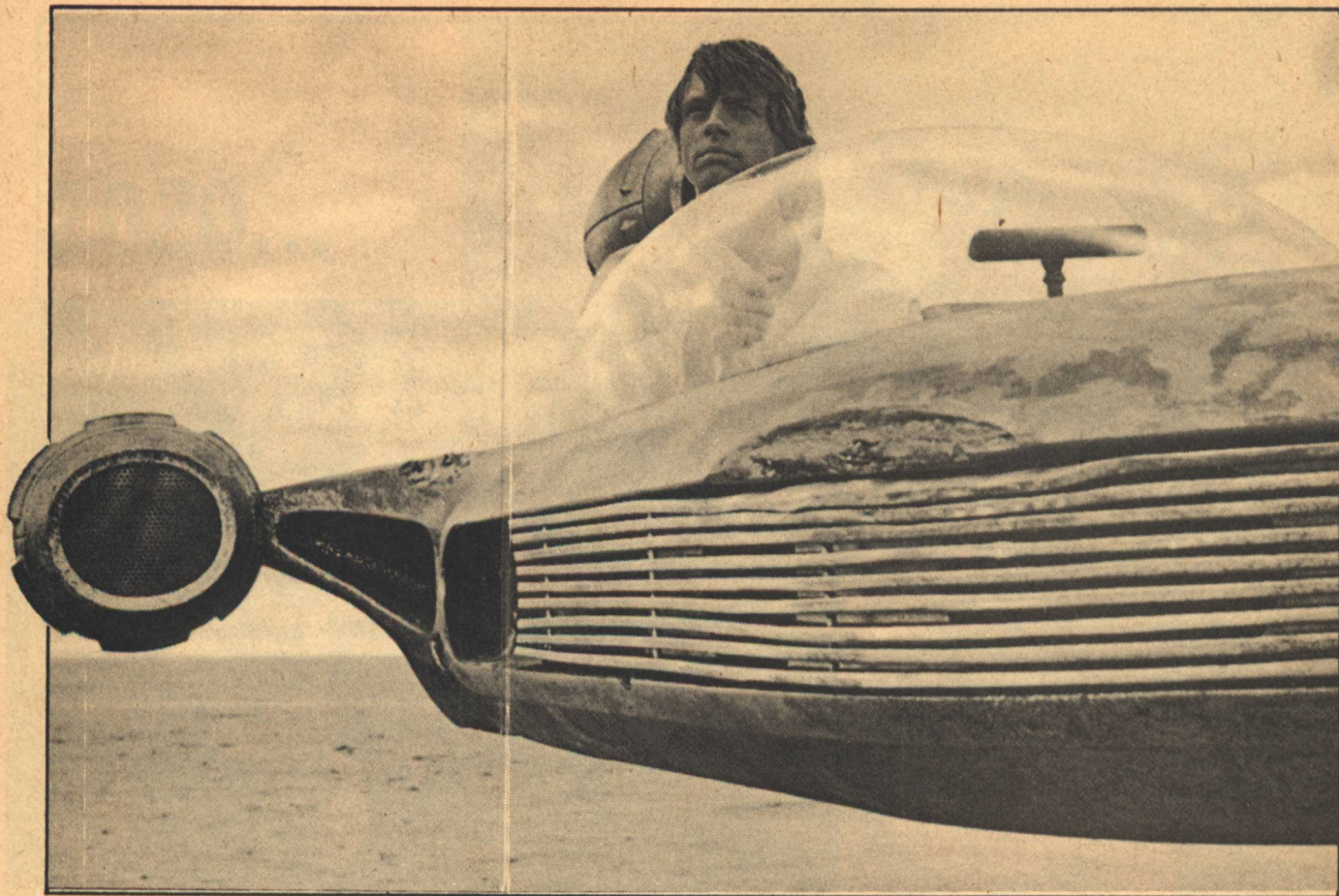
For years and years we've seen those drearier sf films that dulled the viewers' senses with ponderous philosophical messages and produced a craving for beer and television. Even *2001*, while it dazzled the eye, left the brain feeling like a car motor that went 50,000 miles without an oil change. *Star Wars* is different.

To prove it, let me tell you about the plot and characters even if they already have been described in dozens of reviews and articles. There's this princess (her beauty depends on your taste) who's been captured by the evil lord (all dressed in black) and imprisoned in an impregnable fortress. The princess, you see, was helping the rebels against the empire. To rescue her come a swaggering, loudmouth mercenary, his companion who's seven feet tall and doesn't say much except for an occasional grunt, an old hermit who's the last member of a knightly order, and a young man who has grown up in dreamy dissatisfaction on his uncle's farm. The evil lord killed the lad's father years ago and the boy is now being taught swordplay and honor by the hermit. There's also a couple of retainers, one tall and priss, the other short and stubborn. This motley crew

sneaks into the evil lord's fortress (No, they don't do it in a cartload of hay.) where they rescue the princess and escape to the rebel camp. Bent on destroying them for good, the dark lord follows, but the young man, aided by our swaggering loudmouth, destroys the fortress and brings victory to the rebels.

Wouldn't Errol and Basil and even Olivia know exactly what they were doing in a story like that? I didn't mention that they would be using lasers and riding around in space ships that travel faster than light or that the fortress is a 200-mill-diameter space station. You'll notice those things and you'll enjoy them as parts of the story and not some oh so impressive example of special effects.

That has been a weakness of sf movies in the past. You were expected to gaze in astonishment at special effects simply because they were "special." The special effects in *Star Wars* are claimed to be innovative and expensive as is always the claim for such films, but for once the story is not overcome by the special effects and neither is the audience. It's simply a good part of the film but not the only good thing in it.



With its emphasis on entertainment, *Star Wars* may free cinematic sf from the shackles of 'meaningfulness' that have crippled it at the box office for so long, but those fans who fear a wave of brainless, flashy, 'entertaining' sf movies are being pessimistic. *Star Wars* does not mean the elimination of serious themes in science fiction films. It means that those themes and the subject of science fiction are no longer valid as excuses for gimmicks and moralizing, and science fiction will be the better for it.

WIZARDS

by Ralph Bakshi

Reviewed by Alan Levine

The background is often a black and white one consisting of intricate, imaginary cities that suggest the work of Piranesi. The characters themselves are depicted in a variety of styles that run the gamut from the voluptuous details of R. Crumb to the childish simplicity of Warner Brothers cartoons, including several creatures for which no comparisons exist. Ralph Bakshi, the artist, writer and director of *Wizards*, then mixes this animation with live

footage altered by solarization and colored filters and the result is a film of great visual richness. The plot, however, is another story.

It is a thinly contrived allegory about two wizards who struggle for control of our planet in the distant future. A nuclear holocaust has long ago destroyed life as we know it. Now, eons later, the world is divided between two wizards, a good one and his evil brother. They are drawn into an epic confrontation. The good wizard musters an army of elves and equips them with bows and arrows. The bad one rallies his goons around guns and whips them into a frenzy with old film clips of the Nazis at war. The outcome is not like *Agincourt*. Primitive weapons prevail as nature and magic triumph against the darkness of technology.

Who cares?

Wizards may be a feast of visual imagery, but it's also an orgy of weak writing and insipid moralizing.

Encouraging, however, is the evidence that Ralph Bakshi is developing a style. In *Fritz the Cat*, he gave us animated sex with considerable fidelity. In *Wizards*, the sex is soft-pedaled, but cartoon violence is taken one step beyond. The bullet-riddled bodies seem

to bleed real blood. There is also, in each film, at least one example of biting religious satire. These new areas are worth exploring.

The voices are expressive and well synchronized. The most outstanding one is the husky and sensuous voice of the female narrator.

Hopefully, the faults of this film won't harm its attendance, so that we may see others like it. Bakshi is currently alone in making full-length animated films for adults. His next project, though, might be the turning point. He is animating *Lord of the Rings* by J.R.R. Tolkien. Here, of course, he is dealing with a much stronger script, but he will also have to meet much higher expectations as well as people's preconceived notions of how things should look and sound. It will be very interesting to see how it turns out.

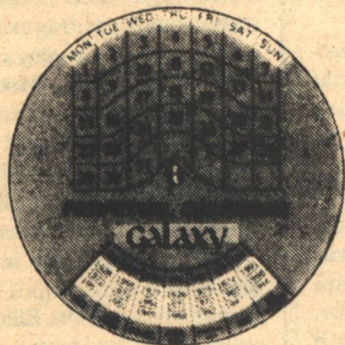
—G—

Recently, NASA, heeding the need for lighter and more compact mechanisms in its machinery, has developed silicon solar cells reduced to as little as 40 microns in width (2/1000ths of an inch). That's thinner than the paper this magazine is printed on.

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Barry R. Bernard

Encyclopedia Galactica

Moons that never coalesced, moons pulled apart by tidal forces, moons destroyed by collision... what?

RING AROUND...

THE ARCHETYPAL example of this column's essence took place between publications. It is such a hope that hopes can become real, that much can yet be discovered when discoveries seem only to confirm predictions. Romantics, we can still marvel. We have seen the kinship of Saturn and Uranus.

The discovery was made aboard NASA's Kuiper Airborne Observatory. This observatory is, under all of its instrumentation, a C-141 aircraft named after the discoverer of the fifth moon of Uranus. Its 36-inch telescope, fairly sizable on the ground, is the world's largest in the air. And one night, suspended between land and the universe, it sought a faint star.

Three-quarters of the atmosphere was below, touching the Indian Ocean, southwest of Australia. Intermediary clouds blocked out the sight of earth-bound astronomers. Dr. James Elliot and two assistants, Edward Dunham and Douglas Mink, waited for SAO 158687 to disappear behind the seventh planet; not at all uncommon, it's called occultation or eclipse. The point of it all was to determine the precise diameter

of the planet and to study the composition and temperature of its atmosphere. As the star passed near and then behind Uranus, the recorded changes in the light intensity would tell all. Well, the data was recorded, but it didn't come without a surprise.

Forty minutes before the manufactured eclipse was to occur, the star blacked-out...and then again...and again...five times in all, over a nine-minute period. Then nothing. After 30 minutes, the eclipse began... 25 minutes and the starlight returned. That part was right, that was the way things were supposed to be, but how long were those next 30 minutes for Dr. Elliot? How long was the wait to see if the strange black-outs would recur? It was 30 minutes, it happened again. Uranus had rings! Four were small, maybe six miles across each. One was much larger though, the outer ring, it was sixty miles across; a deviation from the pattern established in the first encounter suggested that this larger ring was in an orbit not quite circular. Far, far below the closest of the rings was the frozen atmospheric sea, 11,000 miles below. Still, Uranus is much more closely embraced by its rings than is Saturn. So close are the rings that light

from the surface is sufficiently bright to have kept the secret for so long. We peeped, but we could not see.

Perth, Australia and Capetown, South Africa soon agreed that the rings were real. It is surmised that the components are fragments of the early solar system, in pieces smaller than one mile in diameter. Moons that never coalesced, moons pulled apart by tidal forces, moons destroyed by collision... what? Dust between the rings might provide a clue to it all. Dr. Elliot is analyzing the data for an answer. An answer to a question we assumed did not exist.

And what has Dr. Elliot named these new-found residents of our solar system? Who are they, gods or great humans? None of these, they're alpha, beta, gamma, delta, and epsilon. But now, what about the Loch Ness Monster?

A MATTER OF SIZE

WHERE DOES anything begin or end? The question has often been considered by artists and scientists and theologians, but have any convinced you of an answer? The spectrum of possibilities is infinite;

Encyclopedia Galactica



things too small to gather and analyze combine to form things too big to gather and analyze. At present, physical limits are set at quarks on one end, and super-clusters on the other. But we are victims of our middle state, and representations of size, at either end of the spectrum, are meaningless. We struggle to make them intelligible: Andromeda is not 200,000,000,000,000 miles away, it is rather 200 million million miles, or 32,000 light years, or 10,000 parsecs away. An excess of zeroes means nothing to us. Still, some are intrigued by zeroes on either side of the decimal point, and try to imagine the sizes they represent.

I suppose that the range of manifest matter could be outlined, quarks to superclusters. But it would be simplistic to think the only levels are various combinations of smaller particles combining to form larger units. There are great interrelationships that defy the straight step-by-step approach to the construction of a universe. Of course, one might say that quarks will work themselves into neutrons and the like, but that is not always true. Particle physicists suggest the existence of quark stars (*Astrophysical Journal*, vol. 213). They are probably the cousins to neutron stars, but they are stars! A star comprised of sub-atomic particles! They are suggested as black hole heritage. How were so many of the intermediate building blocks lost? Sub-atomic to star.

The densities of these particulate stars are great (a tablespoon could weigh a billion tons), and it is suggested that they may form new matters. Now, a little over 100 elements have been discovered to date, and something in the upper 200's is theorized, but that is all traditional atomic concept. These heavy stars could produce something which is called a 'pion condensate' (*Chemical and Engineering News*, May 16, 1977). Pions are what keep the protons and neutrons of an ordinary atom together. Mathematically, they are a wave or a field, but they can exist independently. At great densities, pions cross a threshold to a more material existence. They can change a neutron star, forcing it to become a black hole (another theory for their existence). It's a new material, superdense.

And there is a superlight material, too. Positronium. The positively charged electron, the positron, can exist for a very short period in an unusual condition. These tiny bits of matter can form their own atom, one orbiting

Barry R. Bernard

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We hope that, by offering a substantial amount in the form of prize money in addition to our regular rates, both new talent and those more established writers who would be more likely to spend their time on longer works, will be encouraged to submit work to GALILEO throughout the year. Frederick Brown, Isaac Asimov, and Ray Bradbury serve as the exemplars of the short-short story in Science Fiction, but "name" value will not be considered as each story is judged on its own merits.

First Prize: \$300, Second Prize: \$200; Third Prize: \$100.

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GALILEO, 339 Newbury Street, Boston, MA 02115

another. It produces a substance 1/2000th the weight of a hydrogen atom, positronium. The periodic table is by no means an end to the family of matter. It is indeed restrictive.

Where are the restrictions of the universe? Already acknowledged is the phenomenon of galactic clustering. The greatest known cluster is comprised of 10,000 galaxies, that's *galaxies!* Its name is Coma. Our own Milky Way is one of 21 in the local group. Is this then the limit? Many astronomers think so. They say that from a sufficiently distant viewpoint, the universe would appear to be fairly uniform, just bunches of galaxies. Yet, as Dr. Jon Darius of University college in London writes in the May 19, 1977 *New Scientist*, that may not be the case. He suggests a method to further understand the inter-relationships of these clusters. First, the galaxies and clusters are grouped according to their distance from Earth. Then grids of successively larger mesh are placed over the plots of a given distance group. The probability of the distribution relative to the particular grid against randomness is then calculated. At a preferred clustering scale, the probability that a distribution is random will be lowest. As the probability that a distribution is random will be lowest. As the probabilities are calculated and plotted, something looking like a left-handed checkmark results. Dr. Darius purports that the lowest point of a cluster's distribution against chance is evidence of superclusters. Using the same technique, other astronomers have agreed. These superclusters are about 20 to 40 megaparsecs across, usually two or three clusters to the supercluster.

We could well be one of these superclusters ourselves. G. de Vaucouleurs of the University of Texas, as reported by Dr. Darius, gives us membership in the Virgo supercluster. Consider as evidence a combination of about 120 galaxies and clusters which exist largely in a circle. This is termed the supergalactic equator. (When plotted, it looks something like a spiral galaxy from the side.) Many of the galaxies in this group are oriented parallel to the plane of this circle. The probability of this being totally coincident is calculated by de Vaucouleurs as being 1: 1,000,000,000,000—one in one trillion.

Quarks to superclusters, for now. Can we rely on these limits? Are there *any* fixed limits? Are there, perhaps, other

universes? Next issue, I'll present a theory suggesting that each black hole is a universe within itself. And what of the anti-matter of the universe? From quarks to superclusters.

COSMIC WAYS

WHIZZING BY and raining down upon the Earth are cosmic rays. Discovered in the early part of this century, they have been flattered by speculation, but regardless of the attention, they have no proven source. Look back through a few years of textbooks and you'll find that it has been generally assumed that cosmic rays come from supernovae. Unfortunately for the publishing companies, it looks as if no revisions will be required, the suspected guest will be revealed soon...but better intrigue might come from it.

No surprises, supernovae are most likely the source of these protons, helium nuclei, and heavier atomic nuclei. The *Chemical and Engineering News* reports the theory of John S. Scott of the University of Maryland and Roger Chevalier of Kitt Peak National Observatory. The supernovae thrust out plasma, a gas containing positive ions and electrons. It is a stormy, searing (100 million degrees Kelvin) intrusion into the universe. It is the apocalypse, an explosion of a type to end our pondering forever. We can see it en route, it is a nebula. Within are magnetic fields, which move in many directions, at as much as a thousand miles per second. One atomic particle catches up to a field moving in the same direction, slowing down, losing energy. But another particle comes from an opposing direction, it smashes into the magnetic field, and bounces off in a wholly new direction—a galactic home run. More often these are increases in energy, allowing that the gradual approach in the same direction takes longer, and thus, the messengers are sent. But their original direction becomes obliterated. Earth-based observers are confused, but a careful trace through known magnetic fields leads to a portion of the Milky Way that has a great concentration of supernovae. There is a hot ring through the center.

The messengers are the protons, helium nuclei, heavier nuclei, and other materials common to our universe. They meet and mix with the ambient materials (mostly hydrogen), and long thereafter field a dust cloud...even-

tually collapsing, smashing atom against atom, building pressure, releasing atomic energy in chain reactions—a star is born. The Sun is just such a star. It is not a ball spit out by the Big Bang, it is the child of myriad parents.

Now the questions come. Where can this lead? Luckily for us, the Sun is not variable. It will likely evolve into a white dwarf, not a supernova. Still, that is not certain. Would it explode, sending its material to the birthplace of its myriad children? The continuation of the universe. Think perhaps of the star as a momentary sparkle of universal time. Are the sparkles to grow smaller and briefer as the universe expands with its fixed amount of material? Or does, as it is theorized, the universe turn into itself? Will all this material eventually return to one mass, a universal Pangea? Has this been the only universe, or one of a series of Big Bangs?

LASER FARE

HOW FAST is cosmic speed? The Russians may soon claim it. Cosmic speed at take-off? They might claim this as well. A pollution-free rocket? Again. The Russians have launched the first laser rocket. (*Sputnik*, April 1977.) It is tiny, just a model of a few grams, but larger rockets will not be of the sizes to which we have grown accustomed. This is because the fuel is air. *Air!* A land-based transmitter sends laser pulses to a parabolic mirror at the base of the rocket. The beams bounce from the mirror to a single point. It is this concentration of energy that propels the rocket. As the beams are focused, they essentially explode the air in the mirror's cavity. Because the energy source remains on land, the bulky burden of fuel is lost as its own payload. True, the atmosphere will thin, but gravity weakens. Orbit is then but a stone's throw...

If the speeds are as I imagine from a word like 'cosmic,' we would never have a chance to ride. We would be crushed. Satellites, materials, supplies, mail (how would that be for delivery time?), anything that we needed in a hurry, could be zoomed to our space station. It seems just about the closest thing conceivable to a transporter beam.

Apologies to positron fans. Positrons have been collecting the imaginations of scientists for a while now.

—G—

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Inquisition

Letters

The American economic system denies that there is such a thing as enough.

Dear Charles,

This is my first letter to an editor, and it had to be written. I've now seen three issues, and my tax refund just came in. You've convinced me. I'm subscribing.

But on to comments. Brian Aldiss's "Where the Lines Converge" seemed a little heavy on style. Also, "reptile men" couldn't "merge with humanity." Reptiles are cold-blooded and oviparous. Mammals, such as humans, are warm-blooded and viviparous. Even assuming that the two species could be cross-fertile, I can't see how viable offspring could happen.

I could have passed over this if your science columns hadn't been so good. And, in spite of the above gripe, I've enjoyed the contents of all three issues. What more can I say than good luck?

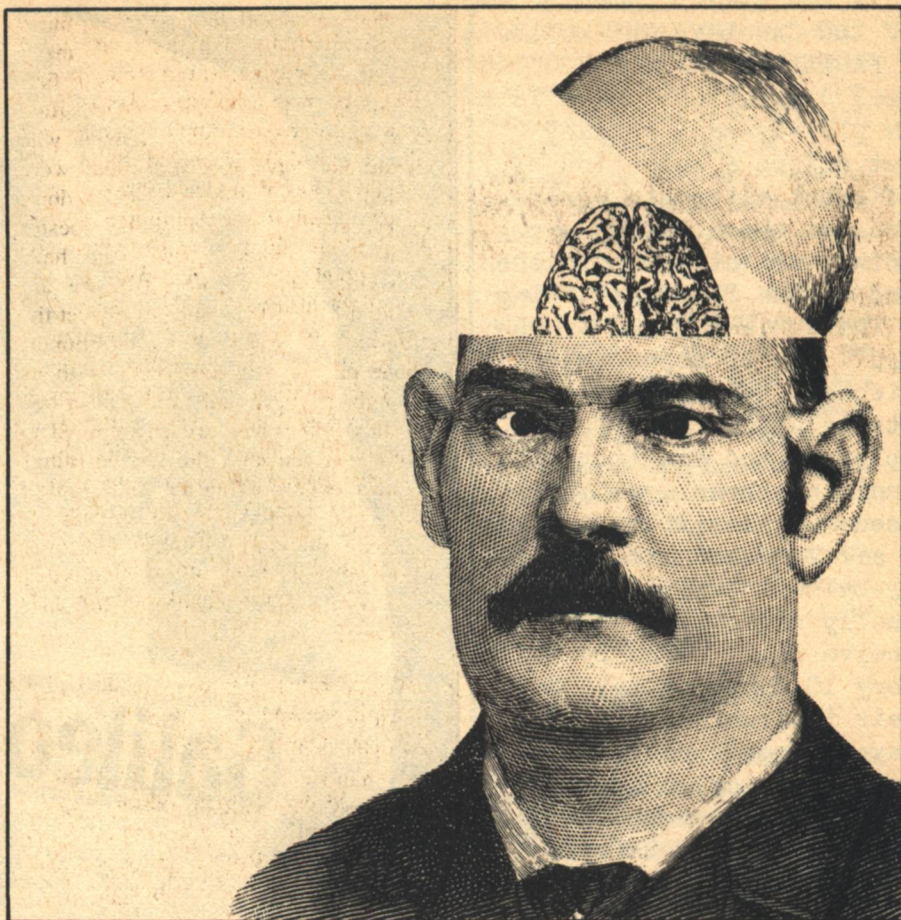
John L. Mitchell, Jr.
Chestnut Hill, MA

Read Hot-Blooded Dinosaurs: A Revolution in Paleontology by Adrian Desmond.—Ed.

Dear Sirs,

Somewhere out there exists a horde of Mack Reynolds fans. I know because the books keep disappearing off the shelves at the bookstore. But trying to get hold of them...

92 GALILEO



Anyway, a group of us have formed into The Reynolds Circle and are publishing a newsletter, *The Section G Report*. Anyone at all interested in Reynolds, or political-social SF in general, is urged to write for free information to the address below.

Pat Bontempo
P.O. Box 721
Hillside, NJ 07205

Folks,

Editorials which miss the point are not uncommon. Editorials which state the point and then miss it, are.

"Very few are willing to give up their luxuries and, in fact, consider most of them necessities." Quantitatively, American industry bases its plans on the expectation that, each generation, we will use 10 times more energy.

What is lacking is not sense in evaluating our energy options. When one speaks of thousands of tons of material which takes 25 times the known history of humanity to lose half its radioactivity, and says, well, it has killed hardly anybody yet, although nobody has been able to store it, what is lacking might be called perspective, or it might be called sense.

At the center of the question is the

lack of a vital concept. The American economic system denies that there is such a thing as enough.

Not all the people agree.

Neil Rest
Chicago, IL

Dear Mr. Ryan,

Congratulations on a fine second issue. Fiction and artwork were both well above par by today's standards for science fiction magazines.

On the fiction side, two stories stood out: Lichtenberg's "Recompense" and Cynthia Felice's "Longshanks." If the quality of Ms. Felice's future work can match this piece, then I'd say she'll be a major talent. I hope you plan to buy more of her stories.

The artwork was better this issue, however I would like to see the cover art reflect a scene from one of the stories. The interior artwork was much improved.

In the departments dept., please keep the author profile and "The Aleph." Both are excellent! and Hal Clement writes a good science article. The book reviews were quite good: in fact, I enjoyed the issue throughout. Thanks!

Randy Richmond
Houston, TX

Letters

Publisher's Notes

What we need now is a computer which programs computers. As many pessimists may have predicted, our first encounter with a computer has resulted in a minor fiasco. Many persons who should not have received them were mailed renewal notices. Please don't worry, even if the computer doesn't know how many issues you have subscribed for, we do. And we are taking the necessary steps to correct the program or scrap the programmer. Those of you who have been with us through our first year, and subscribed for only four issues are encouraged to renew lest you miss the terrific things we have been working day and night to bring you. Longer term subscribers are welcome to recruit friends and local libraries, but need not fear missing their own issues. Thank you for your patience.

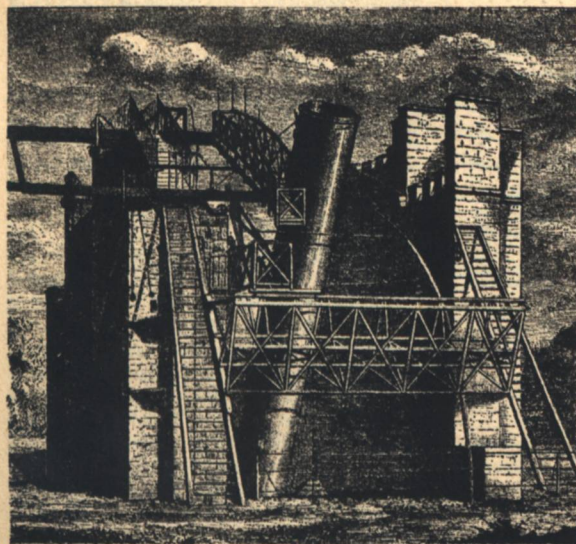
As our rate of pay to the *Galileo* staff doesn't amount to enough lettuce to garnish a fast food hamburger, we were very happy when our undercompensated and over worked editor, Charles Ryan recently won the United Press International (UPI) Newspapers of New England top award for editorial writing.

You see, Charles is also a full time reporter for the *Daily Times* of Woburn, MA. That work actually netted him two awards this year: first place for editorial writing and the Allen B. Rogers Memorial Award for best editorial. We are lucky to have Charles on our side.

A subscriber from the Bronx called us the other day. He had gotten his copy of #3 and he had also received the envelope in which we sent him his copies of #s 1 and 2, as requested. Unfortunately the second envelope had been mangled by a Post Office machine—and from appearances had also been used as the object of desire in a rugby match. As a former Postal employee himself, he wasn't too surprised by all this, or by the fact that the two back issues were no longer in the envelope. What did catch him with his helmet off was the fact that the subject container had been taped back together and upon receipt carried a hard back copy of the illustrated life of Donald Duck. . . . We wonder if there is a seven year old somewhere who appreciates science fiction enough to accept the serendipity.

Telescope

Of Things to Come



Letters/Telescope

"He has respect enough for all our generations, for old Adam and his son Darwin, for my father and myself, but I have never let him guess that we ourselves are the first successful human genotypes, our own first creations, more significant to history than *Homo verus* or *Homo mutatus* or *Homo divinus*."

Slave to Chaos by Jack Williamson

"After Morlock had been left to stew about the conceptual notion of love he was going to be shot full of hormone equivalents and his reaction measured. Instant puberty, if you will."

Tinker's Damn by Lewis Shiner

"When the Russians successfully rocketed the first artificial earth satellites into orbit, the American public in humiliation and alarm turned from administrative sources to the leading popularizer of rocketry and space travel, Willy Ley, for an appraisal of the historic achievements."

Willy Ley by Sam Moskowitz

"I've been predicting a new-Puritanism around the turn of the century as sort of an end-result of the sudden ethical awareness that interests people nowadays."

Interstellar Probe: Gordon R. Dickson interview by Brian M. Fraser

"We have a mere half-dozen names from all of pre-space art, and yours is among them. You are, I believe, roughly a contemporary of Michelangelo? Is he a friend of yours? Your pupil, perhaps?"

A Genuine Old Master by Marion Zimmer Bradley

Classified



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94 GALILEO

NO SEX the science fiction fantasy comic fan magazine devoted to fun and the fans. Sub. 5/\$.35. Numbers 4, 5, and 6 available for \$.50 each. Daniel Watson, Galactic Enterprises 1520 Hedge Road, Champaign, IL 61820.

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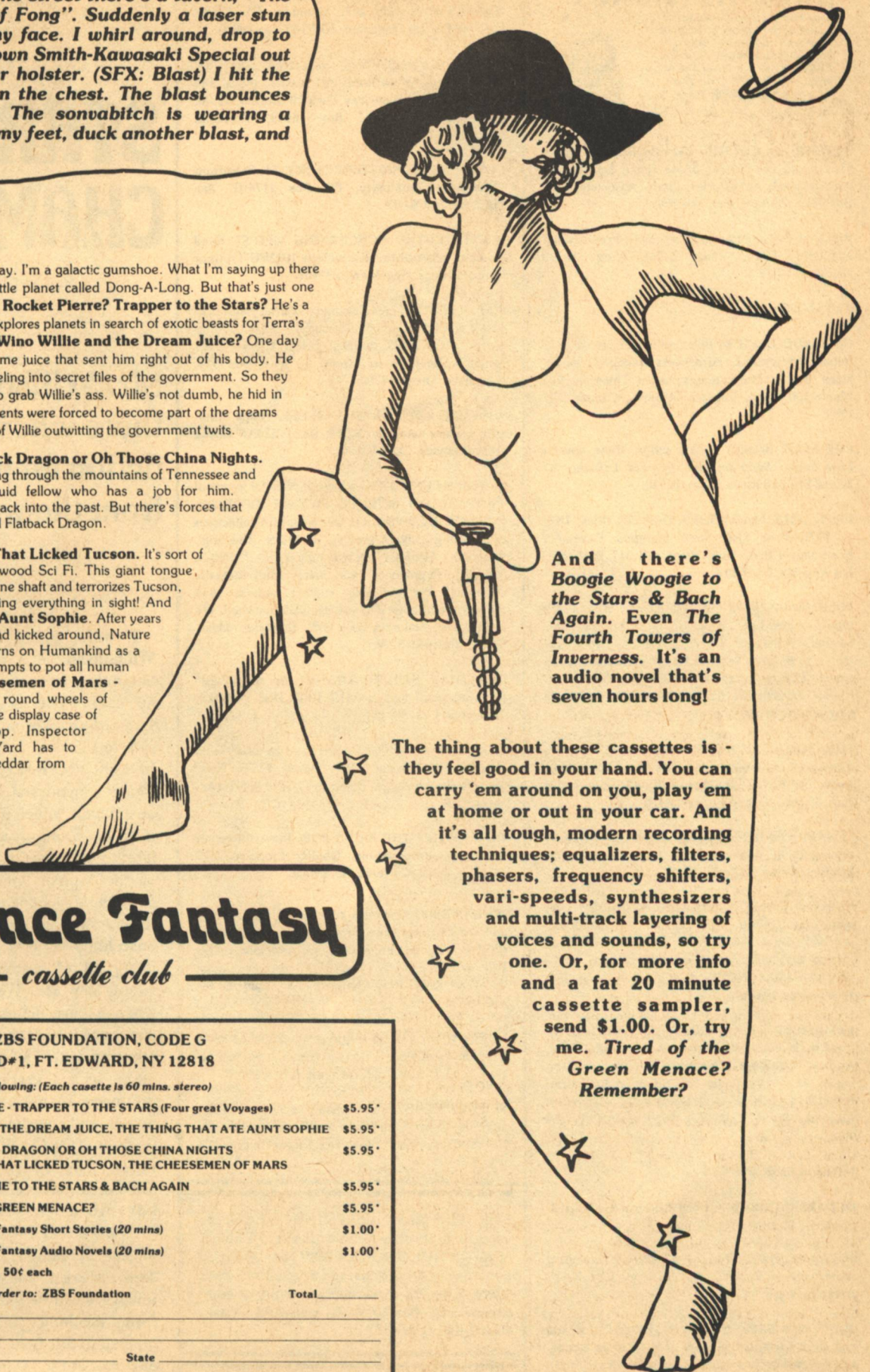
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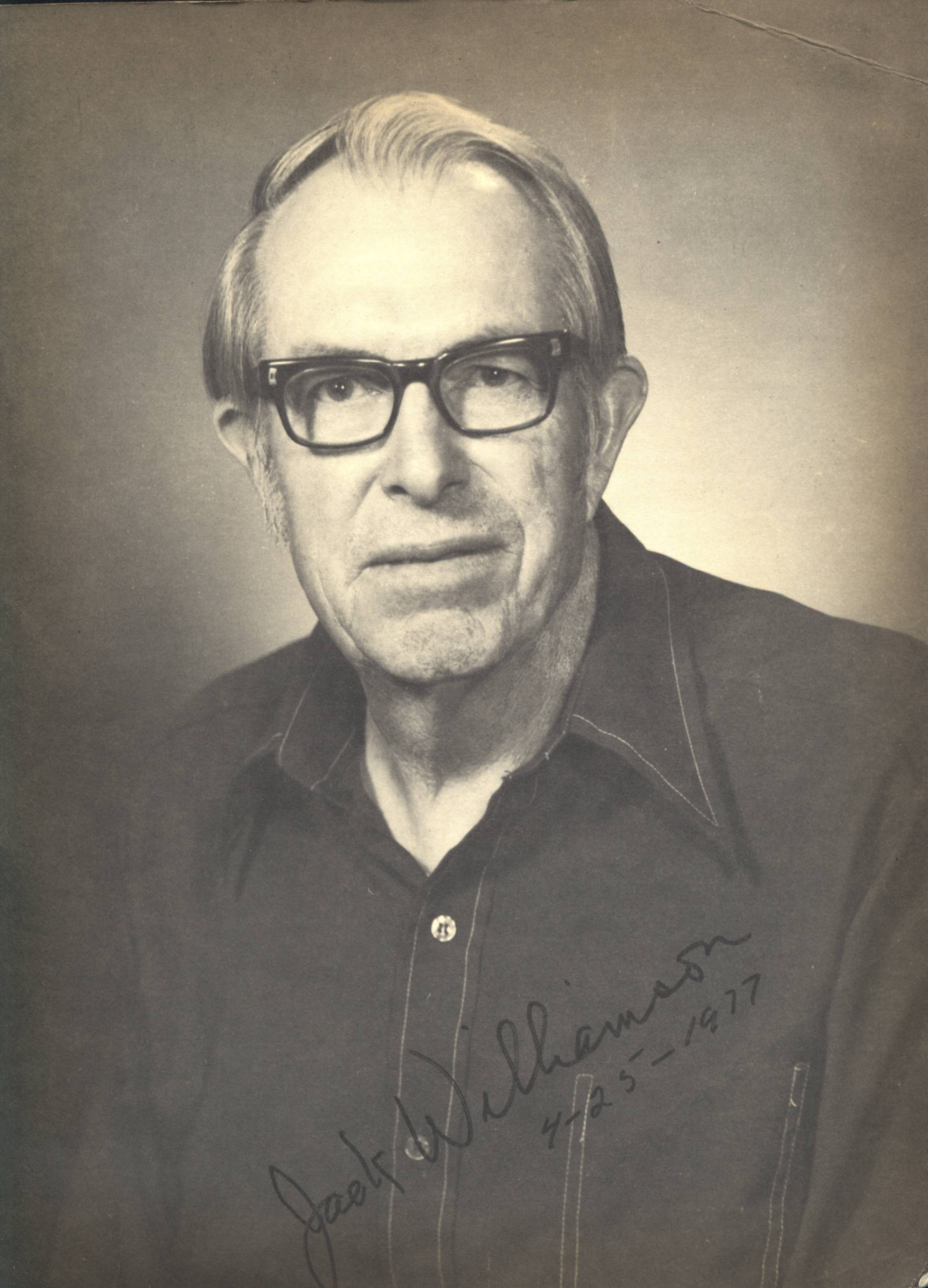
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STAR CHAMBER

Mr. Williamson was there when science fiction emerged from the womb.

If we're going to talk about **Jack Williamson**, let's not go back to the beginning, but only as far as 1934, when he sold "The Legion of Space" to *Astounding*. Perhaps then we should skip to 1938 for "The Legion of Time." In 1940, there was *Darker Than You Think* (considered by many to be his best novel), which presented the unique idea of *Homo lycanthropus* and the latent genes tending toward a reversion of the human species. In 1948, *The Humanoids* appeared serialized in *Astounding* under the title "...And Searching Mind." Rather than chronicling all of his early works, let us simply say Mr. Williamson was there when science fiction emerged from the womb. Many of the genre's present-day features (such as the acceptability of magic as a literary device) betray his influence. He has produced a long list of novels and non-fiction in recent years (including *H.G. Wells: Critic of Progress*, *The Moon Children*, *People Machines*, and a series of undersea adventures in collaboration with Frederik Pohl) and has taught a course in science fiction at the University of New Mexico for many years. His followers will be glad to hear he retires from teaching this year to devote himself to full-time writing. He is Guest of Honor at the Miami Suncon this year.



Jack Williamson
4-25-1977



BARBER